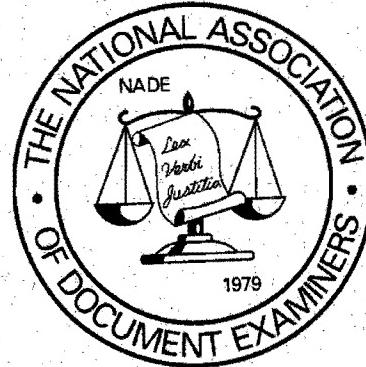


# Journal of The National Association of Document Examiners

---



## CONTENTS:

**Editorial by Emily Will, CDE**

**Multiple Personality Disorder – A Case of Handwriting ID and Ink  
Relative Aging Problems by J. Wright Leonard, CDE**

**Disguise Versus Simulation by Katherine Koppenhaver, CDE**

**Importance of Establishing an Examination Protocol by Barbara Downer, CDE**

**The Role of Digital Imaging in Document Examination by Dr. John C. Russ**

**The United Kingdom's Civil Procedure Rules ("CPR") by Maureen Ward-Gandy, CDE**

**Handwriting Research – Cast a Wide Net by Marcel Matley**

**The Authorities Speak Out on Disguise by Kay Micklitz, CDE and  
Barbara Downer, CDE**

**A Paperless Society? By Phyllis Cook, CDE Emeritus**

## CASE NOTES:

**Examination of a Promissory Note by Joe Jalbert**

**A Case of Two Typists by Heidi Harralson, CDE**

**Forensically Speaking by Phyllis Cook, CDE Emeritus**

# **JOURNAL OF THE NATIONAL ASSOCIATION OF DOCUMENT EXAMINERS**

## **EDITORIAL BOARD**

**Emily Will, CDE, Chief Editor**  
P.O. Box 58552  
Raleigh, NC 27658  
Ph: 919-556-7414  
Fax: 919-556-1135  
[qdewill@mindspring.com](mailto:qdewill@mindspring.com)

**Willa Smith, CDE, Proof Editor**  
5310 Burchette Road  
Tampa, FL 33657  
Ph/Fax: 813-971-2027  
[willasmith@aol.com](mailto:willasmith@aol.com)

**Kay Micklitz, CDE, Publishing Editor**  
4120 Running Springs  
San Antonio, Texas 78261  
Ph: 830-980-4083  
Fax: 820-980-4076  
[kay@micklitz.com](mailto:kay@micklitz.com)

**J. Wright Leonard, CDE, Research Editor**  
1500 Walnut St., Ste. 506  
Philadelphia, PA 19102  
Ph: 215-735-4000  
Fax: 215-735-4022  
[forgeryID@aol.com](mailto:forgeryID@aol.com)

**Barbara Downer, CDE, Special Projects Editor**  
1734 E. 30<sup>th</sup> Avenue, North  
Oxford, KS 67119  
Ph: 620-455-9910  
Fax: 620-455-9911  
[downer@oldwiz.net](mailto:downer@oldwiz.net)

The NADE Journal is an official publication of the National Association of Document Examiners. However, unless otherwise noted, opinions are those of the authors and may not reflect the official policy of NADE.

**JOURNAL OF THE  
NATIONAL ASSOCIATION OF DOCUMENT EXAMINERS**

**TABLE OF CONTENTS**

<b>Editorial by Emily Will, CDE .....</b>	<b>1</b>
<b>Multiple Personality Disorder – A Case of Handwriting ID and Ink Relative Aging Problems by J. Wright Leonard, CDE .....</b>	<b>3</b>
<b>Disguise Versus Simulation by Katherine Koppenhaver, CDE .....</b>	<b>12</b>
<b>Importance of Establishing an Examination Protocol by Barbara Downer, CDE .....</b>	<b>19</b>
<b>The Role of Digital Imaging in Document Examination by Dr. John C. Russ .....</b>	<b>24</b>
<b>The United Kingdom's Civil Procedure Rules ("CPR") .....</b>	<b>34</b>
<b>by Maureen Ward-Gandy, CDE</b>	
<b>Handwriting Research – Cast a Wide Net by Marcel Matley .....</b>	<b>40</b>
<b>The Authorities Speak Out on Disguise by Kay Micklitz, CDE and Barbara Downer, CDE .....</b>	<b>44</b>
<b>A Paperless Society? By Phyllis Cook, CDE Emeritus .....</b>	<b>48</b>
 <b>CASE NOTES:</b>	
<b>Examination of a Promissory Note by Joe Jalbert .....</b>	<b>49</b>
<b>A Case of Two Typists by Heidi Harralson, CDE .....</b>	<b>52</b>
<b>Forensically Speaking by Phyllis Cook, CDE Emeritus .....</b>	<b>56</b>
<b>Submission Guidelines .....</b>	<b>58</b>



## Editorial

Spring has arrived, and with it, changes. Out with the old, and in with the new! Well, it is time for some revitalization here at the NADE Journal as well.

Being the Journal editor for the past five years has been a real opportunity for me – to work with member and non-member authors, to be the first to know about some new developments, to work with a talented and enthusiastic board of co-editors, and to make a contribution to our fine organization. However, this is the eighth issue I have shepherded along, and I find that time limitations are forcing me to give the Journal less attention than it deserves. Therefore, I am stepping back a bit and have had the good fortune of finding a willing and able NADE member to take over.

Barbara Downer, CDE, will be the new Chief Editor. I will stay on the Editorial Board, because I do enjoy the work and want to continue contributing. Willa Smith and J. Wright Leonard will also continue, but Kay Micklitz is going to make this her last issue. Kay has been the person most responsible for the new “look” of the Journal, and has made many other behind-the-scenes contributions. We hope that release from these duties will leave her with more time to write articles. Barbara will have other announcements about the Editorial Board and Journal in her own time.

Barbara actually minored in Journalism and was on the staff of the college newspaper at Oklahoma State University for three years. She completed her degree in Psychology at the University of Central Oklahoma. Barbara has worked as a Juvenile Probation and Parole

Officer for the State of Oklahoma, and as a Crime Scene Investigator for the Wichita Kansas Police Department Crime Lab. She has completed the QD section of the American Institute of Applied Science course and served apprenticeships with Katherine Koppenhaver and Linda James. All this is just to say that Barbara brings to this position a wide range of professional experience and an investigative attitude that will serve the journal well.

Some other milestones have been reached in the past year. Several of our members have retired – Renate Griffiths, Phil Cook, Rae Lyon, and possibly others. Renate served the organization as Certification Chairperson, and Phil was, of course, one of the founders of NADE and served the organization in many capacities. Rae served on the Ethics Committee. We will miss their active participation, but we still might call them up from time to time with a question or two.

Now, to the current issue. Anyone taking the FEPL proficiency testing, and actively doing case work knows that the line between simulation and disguise is often difficult to define. Our president, Kathy Koppenhaver, has written an article that should be useful in this regard. We also have a new section, “Authorities Speak Out.” This will be a regular feature, and we invite all members to contribute quotes and citations. The topic for the next issue will be announced in our online forum and newsletter. This issue’s topic is Disguise. A Case Note from Joe Jalbert also addresses, in part, the issue of disguise.

Dr. John Russ, Professor in the Material Science and Engineering Department at North Carolina State University, and author of *The Image Processing Handbook and Forensic Uses of*

*Digital Imaging*, has contributed an article on digital imaging which serves as a good introduction to these books. At least one of these can be borrowed from the NADE library.

Maureen Ward-Gandy's article on the court system in the UK is an excellent follow-up to our 2001 conference in the UK where several members gave mock testimony using the UK procedures. In a world that is constantly shrinking it is good to know more about other legal systems, especially the one that spawned our own.

It is entirely appropriate that we have an article by our incoming journal editor. Barbara Downer's article reminds us that there is much more to any document than the signature. J. Wright Leonard's article also illustrates that it is important to consider all aspects of a case, and to do research to verify all information put forth in a case. Marcel Matley gives us just a hint of what is available in the way of research at a good library. A Case Note from Heidi Harralson and some contributions from Phil Cook round out this issue.

Emily J. Will  
Editor

## MULTIPLE PERSONALITY DISORDER

### A CASE OF HANDWRITING ID AND INK RELATIVE AGING PROBLEMS

by

J. Wright Leonard, CDE

**The Problem:** Can the handwriting on the originals of two unsigned, one-page notes (Q-1 and Q-2) be identified as having been executed by the subject writer? The questioned documents were found beside the subject writer's bed two days after her death.

**Background:** The 46-year-old subject writer was treated for many years for Multiple Personality Disorder. Over 50 distinct personalities were identified by her physicians. For comparison in this case, contemporaneous documents were presented for examination, including the originals of 15 pages of handwriting in a book similar to a diary (called "Mom's Book"), as well as a check register with 198 entries and various miscellaneous handwritten papers, all known to have been executed by the subject writer on various occasions within a year before the subject writer's death by her own hand.

Four years after the date of death of the subject writer, a forensic ink examiner (opposing examiner) submitted a report that the questioned documents were no older than three years, and therefore executed subsequent to the date of death and further, that in the case of multiple personalities, the writings of two different personalities will not be identifiable with one another.

The questioned and comparison documents were found to be suitable for examination. There was no information available as to which of the multiple personalities executed which entries in Mom's Book or in the check register. The examination revealed that the characteristics of the questioned handwriting (Q-1 and Q-2) were consistent with each other and also that of the subject writer.

The forensic ink examiner stated in his report that "in the case of multiple personalities, the writings of two different personalities will not be identifiable with one another, just as the writings of two different people are not identifiable with one another." (While this may be the case in certain instances, it was not the case in this matter.)

To the knowledge of this examiner, there is no published research which supports the previous statement of the ink examiner. Since the subject writer was diagnosed with Multiple Personality Disorder; since the Q-1 and Q-2 documents were written by two different voices of the decedent; and since the known writing also included writing of various of her personalities that allowed identification with the questioned writing; the statement of the ink expert relating to handwriting did not apply.

Identifying characteristics between the handwritten questioned specimens (Q-1 and Q-2) and the genuine material include, but are not limited to, formations of letters; beginning and ending strokes; placement of "i" dots; connections and disconnections between letters; upper and lower extensions; size; proportions; writing skill level; fluidity; and muscular movement. See illustrations on pages 6-11.

The forensic ink examiner's report stated that an "ink dating examination" was conducted on the questioned documents to determine if they were written in the year of death or earlier. The report stated that: "the test is based on the scientifically proven premise that most inks dry completely on paper within approximately three and one half years." The ink examiner's opinion on document Q-1 was inconclusive, but as to Q-2, the report stated that "the ink was still in the drying process." This led to the ink examiner's opinion that document Q-2 was three years of age or less and therefore was written after the death occurred.

However, research on this subject revealed that in a non-research article an ink examiner stated that: "...ball-point inks completely dry within approximately six years. Of course some inks become completely dry in less than six years."<sup>1</sup>

The opinion of the forensic ink examiner in this case, therefore, was contradicted by published research. Furthermore, the ink examiner did not produce or refer to any published research study that demonstrates with certainty the ability to determine the age of inks on paper within six months through dryness/relative aging tests.

Conversely, consider the findings of Valery N. Aginsky, Ph.D., Ink Chemist and Document Dating Specialist, which state that:

"The relative-aging approach evaluates the age of a Q entry relative to other entries whose dates are not questioned and that are of the same ink formula as the Q entry."

1. *Technical Report with Case Studies on the Accelerated Aging of Ball-Point Inks*, Richard L. Brunelle and Erich J. Speckin, International Journal of Forensic Document Examiners, Vol.4 #3, July/Sept. 1998, pgs. 240-254.

"For years, several ink-dating techniques based on this approach have been routinely used by government and private forensic labs in the United States. I would, however, like to call your attention to the results of my recent study, which give evidence that these techniques are extremely prone to produce erroneous results of ink age determinations."

"Practically speaking, the relative-aging techniques could produce correct resulting data only when inks being compared:

are of the same manufacturing batch;  
have been written on the same paper, under  
the identical conditions of writing, and  
have the same storage history."<sup>2</sup>

Inks on papers stored in different conditions may vary in their drying times. In this case, there is no information relative to the storage of the questioned documents since the date of death. Also, there are other important considerations<sup>2,3</sup> for ink examiners which were not mentioned in the report of this ink examiner:

1. Fresh inks exposed to strong age-inducing conditions may appear older than if stored under normal conditions, and older inks, but not dry, stored under very age-preserving conditions may appear fresher than if stored normally.
2. What the comparison materials were.

2. *Ink Dating – The State of the Art*, Valery N. Aginsky, Ph.D., Ink Chemist/Document Dating Specialist, Presented at the Regional Symposium on Criminalistics, April 20-22, 2000, Istanbul University, Institute of Forensic Sciences, Turkey.

3. U. S. v. Bruno, 333 F.Supp. 570, D. C. PA, 1971

3. Whether Q-1 and Q-2 were written on the same paper and whether the paper could affect the outcomes of the tests.
4. Whether the inks on the questioned and comparison materials are the same.
5. Whether whatever the inks were compared to came from the same manufacturing batch.
6. Whether or not a sample from the document was artificially aged.

After expert document reports were submitted and trial commenced, the opposing ink expert was not called to testify for the defense regarding any portion of the report.

Therefore, the testimony that Q-1 and Q-2 were written by the subject writer, and that the relative-aging tests in this case could not be relied upon to determine when the questioned documents were executed, was presented to the jury and was undisputed.

Illustrations follow on pages 6-11.

*J. Wright Leonard, CDE, with offices in Philadelphia, PA, is a member of the NADE Board of Directors, Chairman of the NADE Budgets and Finance Committee, and a Member of the NADE Journal Editorial Staff and the Life Membership Committees.*

The following illustrations are digital images that have been resized to fit this format. Raw size can not be compared, but other handwriting characteristics are comparable.

I'm one of Peg's others

Q-1

We have been in so much pain both mind and body and we can't get any help from anyone. We have to help ~~to~~ the best we know how. Sorry if we hurt anyone but we has to take care of Peg first. We went to two different hospitals and we were written off. We hope that you can forgive us all of us.

We hope her family and all of her doctors and hospitals

Q-2

She been changing all over. I don't know what to do about it. I can't sleep right, we're not eating right nothing seems to be going right. She has not want to come out but the older ones want her to. Both ~~are~~ they are all up set. We can't take care of our selves. Like taking a bath, washing our hair. I try bath with soap but we're a little more far gone by.

I talked to my friend Barbara and she told me to take her to Barbara's grave, and he said he would go ~~on~~ a sit. I don't know if I can hold on. Good thoughts are going through my ~~head~~ to her.

I just filled my weekly pill box up so I know I have ~~the~~ the right amount to do the job. The point is do I want to do the job, I don't know. I'm scared.

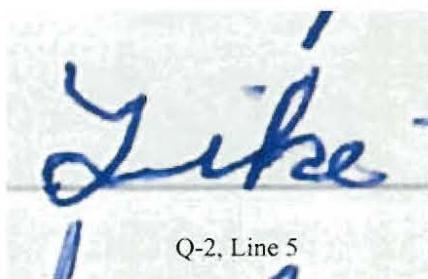
We need to be strong. I need all of you all to stay safe.

#### THE TWO QUESTIONED DOCUMENTS

ILLUSTRATIONS THAT FOLLOW DEMONSTRATE IDENTIFYING CHARACTERISTICS:

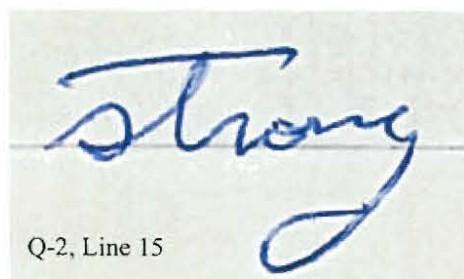
QUESTIONED

---



Life

Q-2, Line 5

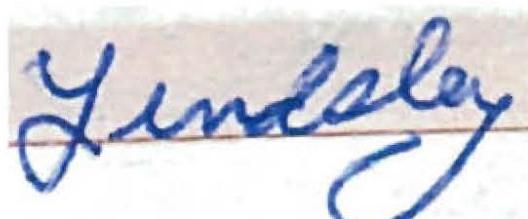


strong

Q-2, Line 15

GENUINE

---



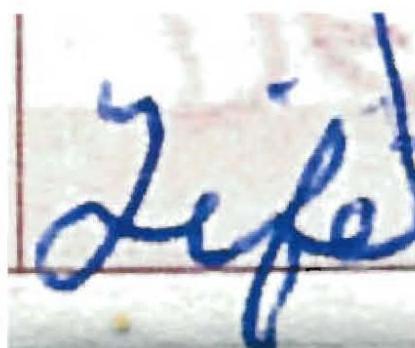
Lindsey

K-1, Ck Register #298



Life

K-2, Ck.Register dated 2/12 (no #)



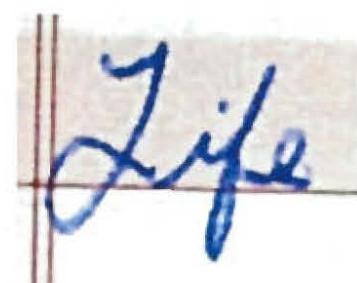
defe

K-2(a), Ck. Register No. 294



Life

K-2(b), Ck. Register No. 295

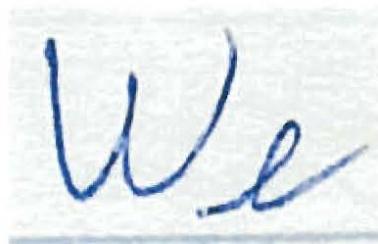


Life

K-2(c) Ck. Register No. 294

QUESTIONED

---



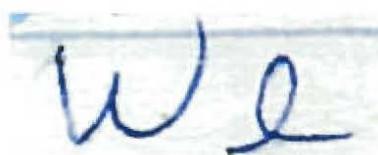
A handwritten signature consisting of the letters "We" in blue ink. The signature is written in a cursive style with a horizontal line underneath it.

Q-1, Line 2



A handwritten signature consisting of the letters "We" in blue ink. The signature is written in a cursive style with a horizontal line underneath it.

Q-1, Line 4



A handwritten signature consisting of the letters "We" in blue ink. The signature is written in a cursive style with a horizontal line underneath it.

Q-1, Line 10

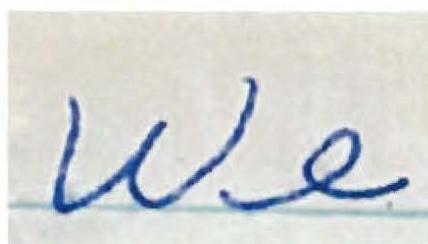


A handwritten signature consisting of the letters "We" in blue ink. The signature is written in a cursive style with a horizontal line underneath it.

Q-2, Line 15

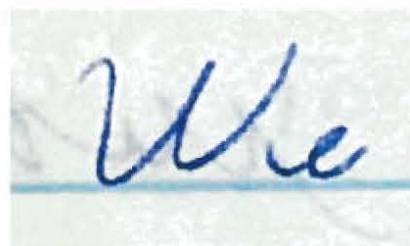
GENUINE

---



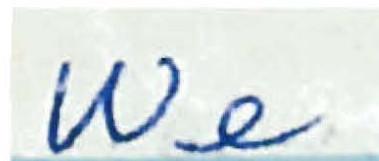
A handwritten signature consisting of the letters "We" in blue ink. The signature is written in a cursive style with a horizontal line underneath it.

K-3, Mom's Book, p. 6, line 2



A handwritten signature consisting of the letters "We" in blue ink. The signature is written in a cursive style with a horizontal line underneath it.

K-4, Mom's Book, p. 9, line 1

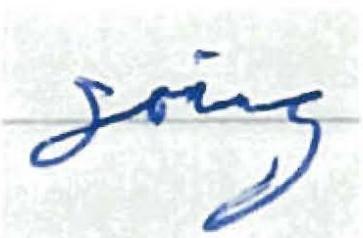


A handwritten signature consisting of the letters "We" in blue ink. The signature is written in a cursive style with a horizontal line underneath it.

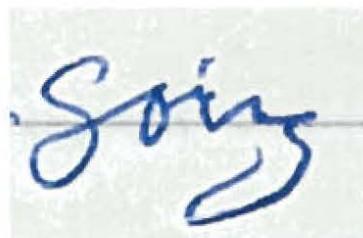
K-5, Mom's Book, p. 9, line 6

QUESTIONED

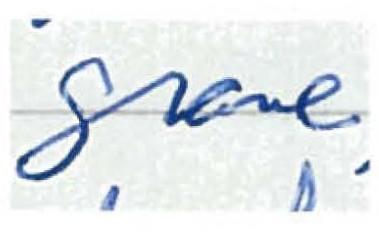
---



Q-2, Line 3



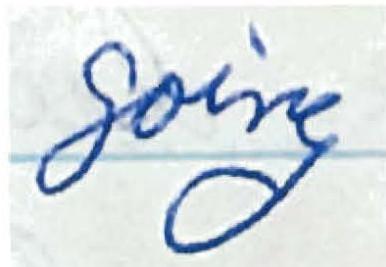
Q-2, Line 11



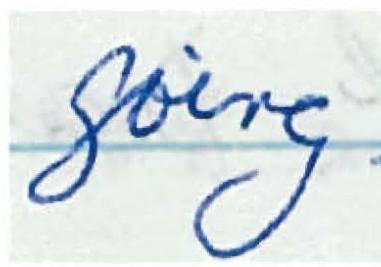
Q-2, Line 9

GENUINE

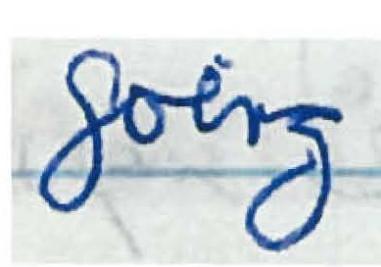
---



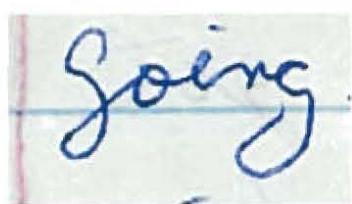
K-6, Mom's Book,  
p.14 line 2



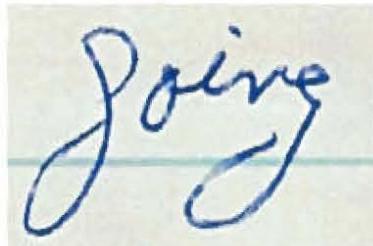
K-7, Mom's Book,  
p.14 line 19



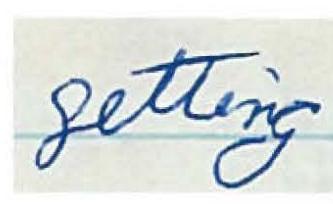
K-8, Mom's Book,  
p.14 line 20



K-9, Mom's Book,  
p.14 line 21



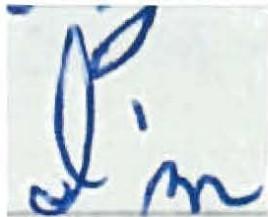
K-10, Mom's Book,  
p.15 line 1



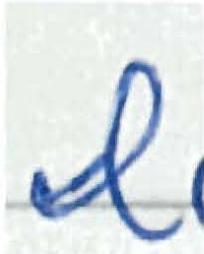
K-11, Mom's Book,  
p.15, line 2

QUESTIONED

---



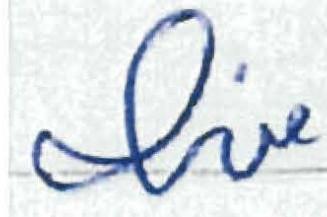
Q-2, Line 14



Q-2, Line 10



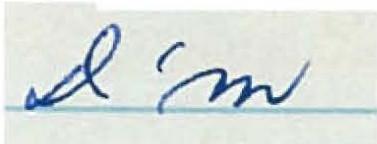
Q-1, Line 1



Q-2, Line 1

GENUINE

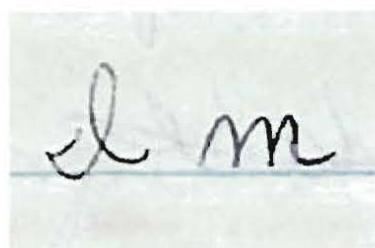
---



K-12, Mom's Book,  
p.15, line 11



K-13, Mom's Book,  
p.15, line 9



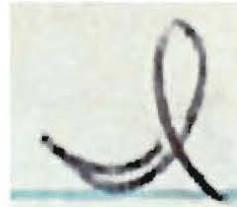
K-19, Mom's Book,  
p. 6, line 22



K-20, Mom's Book  
p.7, line 15



K-21, Mom's Book,  
p.7, line 14



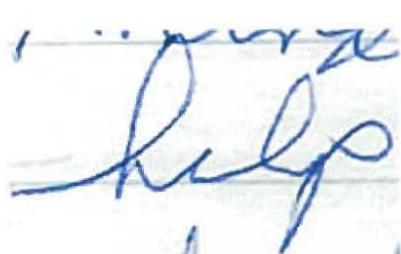
K-22, Mom's Book.  
p.7, line 11



K-22, Mom's Book,  
p.7, line 12

QUESTIONED

---



A handwritten cursive word "help" written in blue ink on a set of three-line handwriting guides. The letter "h" has a vertical stem and a curved loop. The letter "e" is a simple vertical stroke.

Q-1, Line 4 (1)



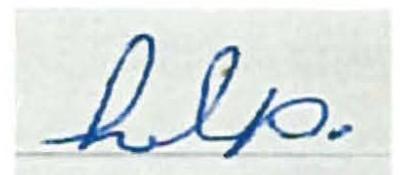
A handwritten cursive word "help" written in blue ink on a set of three-line handwriting guides. The letter "h" has a vertical stem and a curved loop. The letter "e" is a simple vertical stroke.

Q-1, Line 4 (2)



A handwritten cursive word "her" written in blue ink on a set of three-line handwriting guides. The letter "h" has a vertical stem and a curved loop. The letter "e" is a simple vertical stroke.

Q-1, Line 12

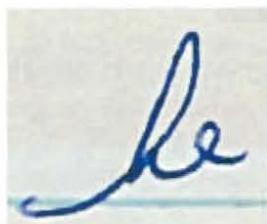


A handwritten cursive word "help." written in blue ink on a set of three-line handwriting guides. The letter "h" has a vertical stem and a curved loop. The letter "e" is a simple vertical stroke.

Q-2, Line 15

GENUINE

---



A handwritten cursive word "he" written in blue ink on a set of three-line handwriting guides. The letter "h" has a vertical stem and a curved loop. The letter "e" is a simple vertical stroke.

K-14, Mom's Book,  
p. 15, line 1



A handwritten cursive word "he" written in blue ink on a set of three-line handwriting guides. The letter "h" has a vertical stem and a curved loop. The letter "e" is a simple vertical stroke.

K-15, Mom's Book,  
p. 15, line 3



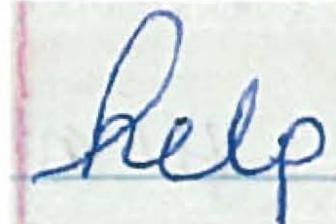
A handwritten cursive word "help" written in blue ink on a set of three-line handwriting guides. The letter "h" has a vertical stem and a curved loop. The letter "e" is a simple vertical stroke.

K-16, Mom's Book,  
p. 9, line 15



A handwritten cursive word "help" written in blue ink on a set of three-line handwriting guides. The letter "h" has a vertical stem and a curved loop. The letter "e" is a simple vertical stroke.

K-17, Mom's Book,  
p. 6, line 10



A handwritten cursive word "help" written in blue ink on a set of three-line handwriting guides. The letter "h" has a vertical stem and a curved loop. The letter "e" is a simple vertical stroke.

K-18, Mom's Book,  
p. 6, line 13

## DISGUISE VERSUS SIMULATION

by

Katherine Koppenhaver, CDE, Diplomate

Most document examiners can identify genuine writing without difficulty. Distinguishing between simulated and disguised writing is more difficult because both processes result in writing that is usually close to normal writing with some deviations.

### METHODS OF DISGUISE

Disguised writing is any deliberate attempt to alter one's handwriting to prevent recognition. Most disguise is relatively simple. Writers believe that changing the general appearance of the writing is an **effective** disguise. Few people can successfully change their handwriting so that it cannot be identified.

The most common method of disguise is a change of slant. Other methods include altered letter forms, using block letters or script, change of size of the letters, change of speed, use of the unaccustomed hand, and abnormal spacing.

A writer who wants to disguise his signature usually makes superficial changes in his handwriting. Frequently the only change in a signature is the capital letter. Writers will often change the design of their capital letters and point to that as proof that it is not their signature. The subtle characteristics of writing are still present.

Most attempts to disguise handwriting are ineffective. The intense concentration, which is essential for the maintenance of any complicated

scheme of disguise, is beyond the capability of the average person (Harrison, 351).

Document examiners must be able to evaluate questioned signatures to determine if they are disguised or simulated. This can be accomplished by distinguishing the characteristics of simulation from the characteristics of disguised writing.

### METHODS OF SIMULATION

Simulation is the copying of someone's signature or handwriting through tracing or free-hand simulation. Tracing is recognizable by the poor line quality and its close adherence to a model signature. A freehand simulation is more difficult to detect. It is also more difficult to create.

When a writer wants to simulate another's writing, he must choose between creating a more accurate signature written slowly or a faster smoother signature that deviates more from the desired path but looks more natural.

Only a small percentage of forgers are able to create a signature that would pass as genuine upon inspection. Often a good imitation signature is created by a family member who shares familial writing characteristics.

Regardless of the method used, it is impossible to concentrate on all the characteristics of writing of another while successfully suppressing one's own writing habits. Any fundamental unexplainable difference with the known writing will be sufficient to demonstrate that the questioned writing is a simulation.

Questioned signatures should be evaluated for signs of disguise as well as signs of forgery.

While some of the signs overlap, there are many differences between disguised writing and simulated writing.

### **RECOGNIZING DISGUISE**

Disguised writing exhibits less fluency than normal writing. The rhythm is disturbed in disguised writing.

The primary sign that writing is disguised will be inconsistencies within the writing. It is very difficult for a writer to maintain the intense concentration needed to suppress his handwriting habits, especially on an extended writing sample. If the writer has changed his slant, it will revert to normal. If he has introduced unusual letterforms into the writing, normal forms may be found interspersed with the atypical forms. Changes of size or speed may be evident.

A German psychiatrist, Dr. George Meyer, determined that the focus of attention in writing is more conscious at the beginning. (Saudek, 22) Thus attention is given to the beginning of a word, a line, a sentence or a paragraph. Conscious awareness diminishes as writing progresses. Therefore, document examiners should focus on the endings of words, lines, sentences and paragraphs. Start your examination of the writing at the end of the writing and work backward looking for inconsistencies throughout the writing.

No one can write a disguised hand which is of higher quality with respect to fluency, rhythm, and letter design than that which is normal to the writer.

A writer may attempt to feign poor writing skill. He may introduce tremor into the writing to divert

### **RECOGNIZING SIMULATION**

Simulation is less fluid than normal writing. It often looks drawn instead of written. Poor line quality is a primary sign of simulation.

Tremor often accompanies poor line quality. When the writer slowly copies another's handwriting, corrugations develop in the writing. These fine back and forth movements are subtle and can be seen clearly when the writing is enlarged under a microscope. Some tremor may be visible without a microscope.

The primary signs of possible simulation are poor line quality, tremor, patching, erasures, inappropriate blobs of ink, hesitation strokes, penlifts, and conscious attention to the act of writing.

Because a writer's focus of attention wanes as he moves the pen across the paper, the writing returns to the normal writing of the writer. Look for changes in characteristics toward the end of the passage.

No one can write better than he can write. If the questioned material is of a higher skill level than the writer could write, it is not genuine. This is especially true in the writing of the elderly or infirm whose writing is erratic. Generally people attempting to copy the writing of the elderly or infirm will introduce deliberate tremor into the writing but will make intricate designs and smooth sections of writing that are not consistent with the rest of the writing. An improvement in line quality is an indication of simulation.

### **RECOGNIZING DISGUISE (cont)**

attention away from himself. However, these writers usually reveal their skill in subtle areas which would be inconsistent with poor writing.

There may be smooth curves within the writing that could not be executed by unskilled writers. Look for changes in skill level in the writing.

The writer of disguise will alter the obvious characteristics of his handwriting while still including his own inconspicuous features. He will change the capital letters of his signature and ignore lowercase letters. The writer concentrates on altering the pictorial effect of his writing to make it appear different from his normal writing.

### **TYPES OF DISGUISE**

Most disguise is superficial, ineffective and limited to altering one or two writing features.

Change of slant is the most common method of disguise because it dramatically changes the pictorial effect of the writing. The writing looks different.

Writers of disguise resort to other-hand writing because it also changes the appearance of their writing. Opposite-hand writing usually contains tremor and abrupt changes in direction.

Sometimes disguised handwriting features are mirror images of normal writing features. Many writers of disguise feel that alternate letter forms will hide their identity. For example, they will print if they generally use cursive or introduce grotesque or exaggerated features into the handwriting.

### **RECOGNIZING SIMULATION (cont)**

Simulations will frequently bear a strong resemblance to the signature used as a model. Since no one can duplicate his own signature, a penned signature that exactly matches another is not genuine.

Consider the focus in simulation. The writer is attempting to put aside his own characteristics while copying someone else's. Writing is such an ingrained habit that it is difficult for one to set aside his own writing habits and imitate another's.

The writer who is simulating will concentrate on the obvious features but will fail to include the inconspicuous characteristics. Forgers cannot concentrate on copying all of the habits of another writer.

### **TYPES OF FREE-HAND SIMULATION**

Few people are capable of copying another's handwriting so that it cannot be detected as coming from a different writer.

Most forgers concentrate on the pictorial effect of the writing they are copying while overlooking the habits of the writer. They will copy obvious peculiarities of the writer they imitate and miss the subtle details.

While forgers attempt to copy handwriting they will frequently use a different method of construction. The method of construction includes the direction of the writing, the sequence of strokes or the touching up of letterforms.

Some characteristics of writing are the same for disguise and simulation. Rhythm may be disturbed in both. Writing may be slower. Inconsistencies are more likely. However, there are more differences between disguise and simulation than similarities.

### **CHARACTERISTICS OF DISGUISE**

1. Moderate writing speed.
2. Deviation from model.
3. Capital letters changed.
4. Subtle characteristics present.
5. Correct master pattern.
6. Inconsistent characteristics.
7. Adheres more closely to known.
  
8. Correct method of construction.
9. Moderate rhythm.
10. No pen lifts or blobs of ink.
11. No patching.
12. More natural writing.
13. Change of slant.
14. Different size.
15. Proportions the same.
16. Some unusual letterforms.
17. Similar arrangement.
18. Utilization of space similar.
19. Same baseline.
20. Pressure patterns the same.
21. Pictorial effect different.
22. Similar spacing.
23. Similar line quality.
24. Similar margins.
25. Similar pressure patterns.

### **CHARACTERISTICS OF SIMULATION**

1. Slowly written material.
2. Attempt to imitate model.
3. Capital letters close to model.
4. Subtle characteristics missing.
5. Correct master pattern missing.
6. Lack of natural variation .
7. Adheres more closely to rules of penmanship.
  
8. Incorrect method of construction.
9. Poor rhythm.
10. Pen lifts and blobs of ink.
11. Patching.
12. Conscious attention to the act of writing.
13. Similar slant.
14. Same size.
15. Proportions different.
16. Similar letterforms.
17. Different arrangement.
18. Different utilization of space.
19. Different baseline.
20. Even pressure indicative of drawing.
21. Attempt to imitate pictorial effect.
22. Spacing more variable.
23. Poor line quality.
24. Different margins.
25. Different pressure patterns.

Writing is such an ingrained habit that it is difficult to suppress one's own characteristics. Most writers are not aware of their subtle characteristics and, therefore, are unable to suppress them. Most writers who are attempting to disguise can only concentrate on one or two changes at a time. There are a few writers who

can concentrate on three or four changes in their writing habits, but no one can concentrate on all of the characteristics of writing. Most writers of disguise feel that a slight change will be sufficient to avoid detection.

Simulation is more difficult to execute than

disguise because the simulator must concentrate upon imitating someone's handwriting while suppressing his own characteristics.

Some characteristics are easier to change than others. These include slant, speed of the writing, letterforms, size of the writing and spacing because writers are more aware of these characteristics. Some characteristics are overlooked by writers attempting disguise. This includes the method of construction, baseline alignment, and the utilization of space. The subconscious characteristics that are not altered are pressure patterns, proportions, involuntary hooks and ticks and pattern formations.

## OBSERVATIONS

Compare any natural writing that can be found among disguised or simulated samples. It is nearly impossible to concentrate on extended passages of writing when attempting to disguise

or simulate. The writer's own habits will come through.

Keep in mind the key differences between disguise and simulation. It may not always be possible to distinguish disguise from simulation but if you follow these guidelines, you will more likely be able to discern the difference.

The illustrations that follow are printed with permission of Dr. Bryan Found at the National Institute of Forensic Science in Victoria, Australia. They are numbered as they appeared in the Handwriting Expertise Validation Trial given by the Forensic Expertise Profiling Laboratory in July of 2001. To give you an opportunity to apply the information in this article, the answers as to whether the questioned writings are natural or disguised writing of the subject writer, or simulations by a different writer, are given on page 18 of this journal.

## Bibliography

Found, Dr. Bryan and Rogers, Dr. Doug, *Handwriting Expertise Validation Trial*, Forensic Expertise Profiling Laboratory, Victoria, Australia, 2001

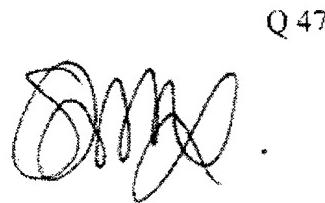
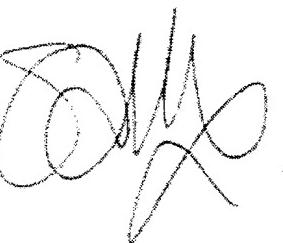
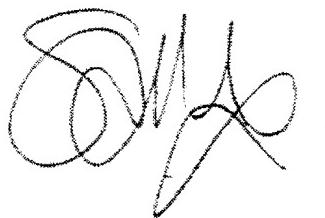
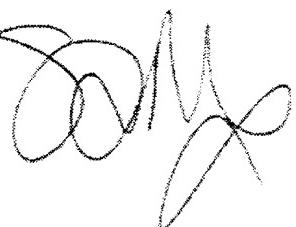
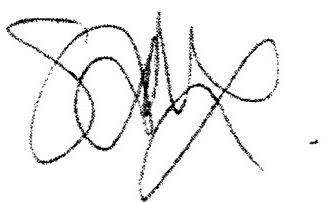
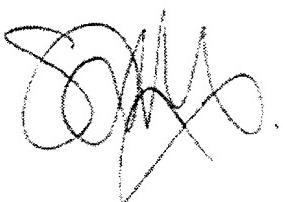
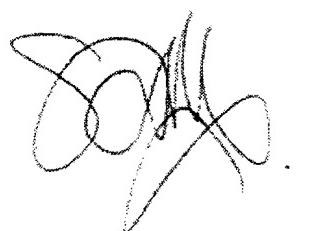
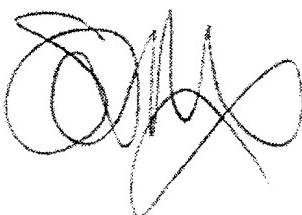
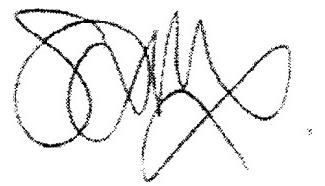
Harrison, Wilson, *Suspect Documents*. Nelson Hall Publishers, Chicago, IL, 1981

Koppenhaver, Katherine Mainolfi. *Attorney's Guide to Document Examination*, Greenwood Publishers, CT, 2002.

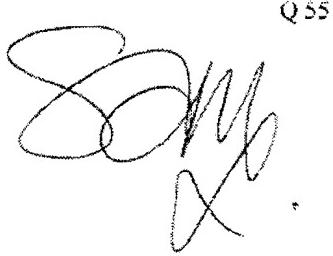
Saudek, Robert, *The Psychology of Handwriting*, George Allen & Unwin, Ltd., London, 1925/1954

Koppenhaver, Katherine. "Disguised Writing," The NADE Journal, May 1990.

*Katherine Koppenhaver, CDE is a past president, the current president and a Diplomate of NADE. She is the author of a course of study, several books and many articles in the field of forensic document examination. Mrs. Koppenhaver and her husband, William Koppenhaver, are the owners of Forensic Document Examiners outside Baltimore, MD. They can be contacted through their website at <http://forensicdocumentexaminers.com> .*



Q 47

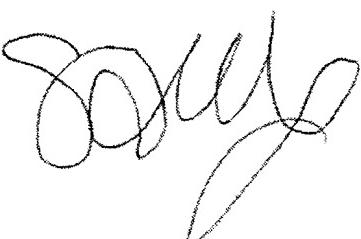


Q 55

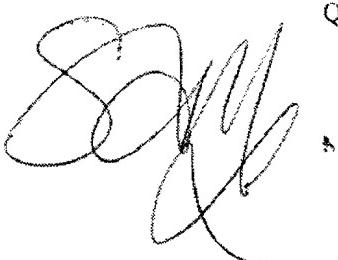
The images are reproduced with the permission of Dr. Bryan Found, of the Forensic Expertise Profiling Laboratory at LaTrobe University in Australia. The eight signatures to the left are known signatures. The five numbered signatures below are questioned. These are from the 2000 FEPL Signature Examination Validation Trials. In the actual test, the images are high quality laser printed scans, and electronic files.

Answers are on page 18.

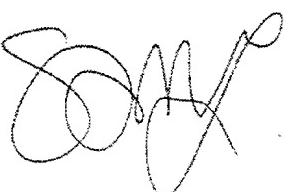
Q 23

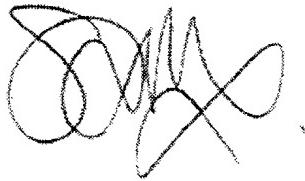


Q 46

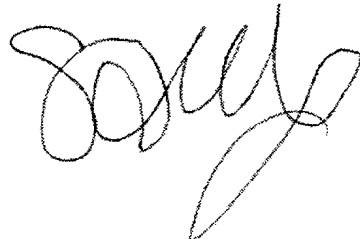
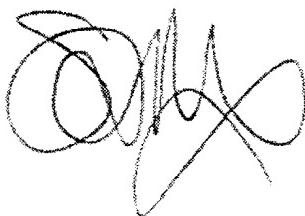


Q 81

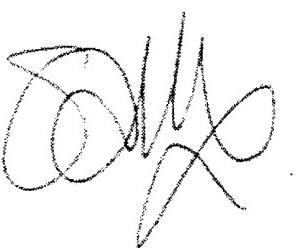
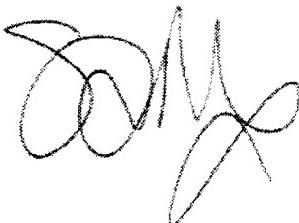
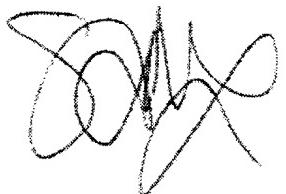
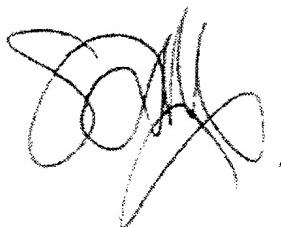




Q 23

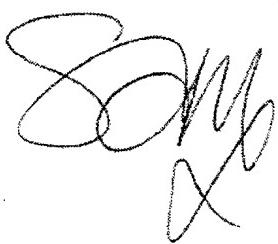


Q-23: Poor line quality indicates slowly-drawn writing associated with forgery. Most writers do not write that slowly when disguising their signatures.



Knowns: The writer has a consistent, stylized signature. Good writing skill increases the challenge for the simulator.

Q 55



Q-55: As in Q46, the writer came close to imitating the pictorial effect, but initial and terminal letters are not constructed correctly.



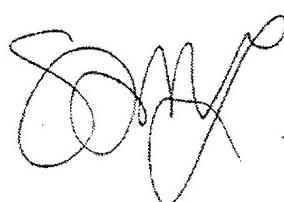
Q 46

Q-46: The simulator captured the pictorial effect but failed to duplicate the method of construction of either the initial letter, or the final letter that resembles a capital L.

Q 47



Q-47: The disguise is a smaller, more compact writing, but most elements of the knowns are present, and line quality is good.



Q-81: The disguise is a change to the final letter. A hitch in the previously good line quality just before that letter may be a "hitch" in the writing caused by the change of habit.

## **IMPORTANCE OF ESTABLISHING AN EXAMINATION PROTOCOL**

by

Barbara Downer, CDE

**Abstract:** The majority of questioned document questions center on a request to examine signatures or other writing to determine authenticity or authorship. In the pursuit of this requested goal, the other parts of the document may not be considered or even examined by the document examiner. However, should the document be examined in its entirety, the more thorough examination may reveal clues to consider in determining the correct opinion or assisting the client in further discovery efforts.

While most document examiners are asked to analyze signatures on various documents to determine if they are authentic or who wrote the document, the examiner should be more than just a handwriting expert. In order to be a document examiner, one should do just that – examine the document – not just the signatures or handwriting. When a document is in dispute, most of the emphasis is placed on the authenticity of the writing, not on the other contents of the document. An examination of a document may reveal dates that do not match the situation such as a signed document dated after the signer was deceased. A copy of a questioned document may contain a cut-and-paste from another document. And, by examining and comparing all the known documents available, it may be possible to discover the source of the questioned signature. While the signature may be authentic, its placement on the document in question could be spurious.

A practiced document examiner should consider every aspect of the document. This can be accomplished by establishing an examination protocol of various questions relative to the document such as:

1. If there is a watermark: Was the paper manufactured prior to the document date?
2. If it contains a letterhead: Was the company in existence at that time? And was it located at the address in the letterhead on that date?
3. If it contains a zip code: Were zip codes in existence at that time and is it correct?
4. If it contains a signature and date: Was the person still living on that date? And was (s)he physically able to sign the document?
5. If paper is irregular size: Has it been cut or trimmed to hide other information?
6. If there are blotted out areas: What information has been obliterated?
7. If typewritten: Did the same machine accomplish all the typewriting? What is the size and typeface style?
8. If several typewritten pages: Do all the pages come from the same machine? And do they have consistent margins, numbers, alignment and paper?
9. If more than one handwriting is present on the document: Who is (are) the other writer or writers on the document?
10. If several pages of writing: Does the content make sense or does a page appear to be missing?
11. If a pre-printed form: Was the form manufactured before the date on the document?
12. Unusual arrangement or gaps in spacing: Does it appear to have been created from other documents?
13. If a check: Is the date in sequence with other checks written before or after it? Does the endorsement match the writing on the face of the check?

14. If it is a copy: Is the original available? And if not, why not? Also, is it a first generation copy or multigenerational copy?
  15. If witnessed: Are all the witness's signatures authentic?
  16. If notarized: Is the notary's signature and stamp authentic?
  17. Other writing on document besides just signature: Does the writing belong to the person who allegedly signed the document?
  18. Continuous records: Are the dates in sequence? And does it appear that any entries have been crowded into a space?
  19. Misspellings: Is it inconsistent with person who signed document to misspell a particular name or word, or several words or names?
  20. Soiled, rumpled, and creased: Is condition consistent with reported age or storage of document or does it appear that the document has been artificially aged to match document date?
  21. White-out: What is under the whited-out material on the document?
  22. Folded document: Is there writing crossing a fold? And was the writing done before it was folded, or after?
  23. Staples: Has the document been unstapled and restapled? And how many times? Do the staple holes match?
  24. Pencil marks, carbon lines or impression: Are any of these present in the signature line to indicate a tracing?
  25. Embossment: Is there a pressure pattern on the back of a known document to indicate that it might have been used as a model for tracing? Or does an exemplar of a known signature appear to be an exact duplicate of the questioned signature?
  26. Indentations: Are there indentations of writing on the document that could be recovered with an ESDA machine or side-lighting?
27. Tremor: Is it also present in the standards of the same approximate time period? And does the tremor appear genuine or simulated?
28. Color of ink: Is all the ink on the document in the same color?
- While not all documents may contain a problem, in order to properly examine a document, the possibility of a problem should be considered. All documents should be examined in their entirety to determine if there are any red flags concerning the document that merit further research or investigation. Many times there may be an explanation for the observed problem, but in some cases, the problem may be ancillary to the examination of the signature(s) or other writing.
- Ordway Hilton in his *Scientific Examination of Documents* writes, "Basically, the examination of a questioned document is a detailed analysis of the whole, of all its elements, prominent and minute. The final opinion is an evaluated summation of the findings of these separate studies."
- It would be far better to do a detailed analysis of a document in order to uncover any problems before your opinion is challenged because others have discovered a document flaw. And also, the client may want to just use your opinion to support that the signature is authentic, when in fact it is genuine, but it is the document itself that is fraudulent. A thorough examination of the document as a whole might prevent this misuse of your services.

In *Fundamentals of Document Examination*, Edna Robertson writes, "The condition of the document should first be examined to determine if it is legible and suitable for comparison and to search for evidence on the document – **other than the writing** (emphasis added) – that might contribute to resolving the question." Thus, she suggests that all parts of the document should be examined before one begins an examination of the writing. The problems with the document should be noted as field notes and photographed for preservation of the observed situation just as it was when you examined it.

The document examiner should create a checklist of examination questions to consider and uniformly examine each questioned document in a logical point-by-point fashion. Some categories will not apply to the document, but a checklist would ensure that a problem might not be overlooked.

One case in which examining the whole document yielded an important part of the strategy for the plaintiff's attorney involved a medical malpractice suit. The attorney was seeking to determine the identities of what appeared to be five different writers on a patient intake sheet titled Physicians Orders. The known documents were nurses' notes, which contained entries with signatures by various staff attending a 23-year-old female patient. This patient died only two weeks after being admitted to the long-term care facility. The form in question contained no signatures with the handwritten entries except for a physician's rubber stamp signature with two typed entries. All of the staff members denied having written on the admission form.

In going through the daily nurses' notes, it was noted that the first page had an entry by a staff

member which began: "1-15-96 3-11 Arrive @GWSC approx. 2:00p..." An examination of the questioned Physicians Orders revealed that it stated the admission date as 1-14-96, a full day before the nurses' notes stated the patient arrived. (See Illustration 1)

In comparing the various staff members' writing to the questioned form, not only were the identities of the five writers determined, but it was also determined all the dates on the entries were by a single writer instead of each writer dating his or her own entry. Because the questioned form contained the wrong arrival date, the attorney proposed to the jury that the form had been created after the patient died to show a different condition on arrival than her actual physical condition. Further evidence was presented at trial showing the patient was starved, beaten and sexually abused.

The conclusion of this eight-week trial was a verdict in favor of the plaintiff and what was reported to be the third largest monetary award (\$4.4 million) in the history of U.S. Federal Court trials in Kansas.

Another case involved the signature on a restaurant inventory list for purchasing purposes. The client, a Mr. Sau Van Pham, stated it was his signature on the document but did not recall signing that particular document among all the other documents during his purchase of the business. The seller could only furnish a copy of the document and stated she had given the original to Mr. Pham. The examination of the copy revealed it was a "cut and paste" signature on the document. This is shown in the lower portion of the P in Pham being cut off as Mr. Pham wrote the P in Pham in the lower case form with lower zone open at the bottom. Also shown is a faint mark of a paper edge below the

right side of the signature where his signature was placed on the document. (See Illustration 2)

Mr. Pham was able to successfully prove that although it was his signature on the document, he had not signed the original inventory list.

In summation, a thorough document examiner should be looking at all evidence available to assure that the final opinion reflects a detailed analysis of the entire document. By examining more than just the writing on a document, the examiner can more accurately answer the questions of authenticity or fraud originally requested by the client.

*Barbara Downer, BA, CDE, has been a member of NADE since 1995 and was board certified by NADE in 1998. She has a BA in Psychology from the University of Central Oklahoma and completed her questioned document certificate through the National Questioned Document Association of Dallas, Texas. In addition, she completed the questioned document section of the American Institute of Applied Science. Ms. Downer has previously served on the NADE Journal Editorial staff and is currently a member of the NADE Certification Committee.*

#### References:

1. Hilton, Ordway, *Scientific Examination of Documents*, 1956, Callaghan & Co., Chicago, IL
2. Hilton, Ordway, *The Whole Document*, International Journal of Forensic Document Examiners, Vol. 2, Number 2, April/June 1996, Shunderson Communications, Ontario, Canada.
3. Robertson, Edna, *Fundamentals of Document Examination*, 1991, Nelson-Hall, Chicago, IL.

Q-1 ID NO: P-PDPRE

## PHYSICIAN'S ORDERS

Order No.	ORDER DATE	E/C DATE	DIAGNOSIS CODE	PHYSICIAN'S ORDER
OL			O	ADMIT TO GOLDEN WEST SKILL CENTER
99			O	DIAGNOSES:
X	1-14-96			Mild to Moderate M.
	1-14-96			H/o Migraine HFs
2				Adjustment disorder
ZOL	1-14-96		O	DIET: Regular <u>ad lib</u> .

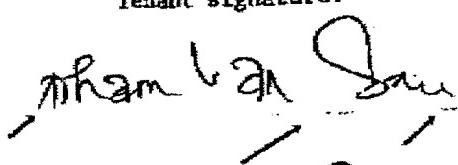
K-1

1-15-96 3d Arrive @ GWS approx 1:00p T-  
 1 P-114, R-M. Regressive for approx. 10 days  
 to self. Quiet. Patient brought in  
 via their car. LF-153. Current P.  
 Depakote Sprinkles 125mg each - 5cs  
 of Gepp's in pm. Amitriptyline 75mg  
 Patient stated to use acetaminol + Tylenol

Illustration 1 (above) - The questioned Physicians Orders (upper) stated the admission date as 1-14-96, a full day before the nurses' notes (lower) stated the patient arrived.

Tenant signature.

Q-1



K-1

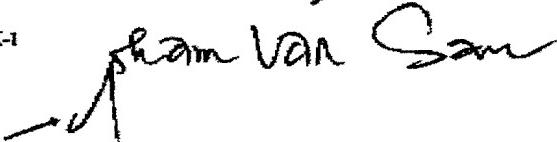


Illustration 2 (left) - The lower portion of the "P" is cut off, and a faint mark of a paper edge below the right side of the signature on Q1. This is good evidence of a "cut-and-paste" process. The signature is genuine, but the document is not authentic.

## THE ROLE OF DIGITAL IMAGING IN DOCUMENT EXAMINATION

by

Dr. John C. Russ

### Reasons for using digital acquisition:

The advent of digital cameras and computer based image processing has caused major changes in the way that most types of forensic imaging are performed. Applications as diverse as crime-scene imaging, surveillance video processing, verification of identities, processing of DNA protein separations, and laboratory recording of microscope images of evidence, have all benefited from this new technology. Document examination is also being affected.

One of the advantages that is most obvious is the immediacy of the images, so that without any delay for processing (or the marginal quality and high cost of Polaroid® film) the content and quality of the images can be verified. A second important advantage is the ability to store, duplicate and transmit images without loss of quality. Photographic prints never capture all of the information recorded on the film, and with every subsequent duplication there is additional loss. Placing copies of image files onto a writable CD is a convenient way to provide copies for all parties in a legal contest, giving everyone equal access to the original data. And of course internet communication has become ubiquitous.

Sometimes the claim is also made that digital imaging is less expensive than traditional photography, but if quality hard copy images are needed the costs are not significantly less.

Coated papers, and either archival inks or dye sublimation printing add up to several dollars per print, only slightly less than darkroom supplies (although the time spent and cost of manpower may be reduced). Digital cameras still cost significantly more than film cameras of the same quality and versatility, but those costs can be amortized over many photographs.

There are important issues still to be fully resolved regarding ways to search data bases of images for specific content, and to provide rigorous chain-of-evidence tracking of images to assure that no inappropriate manipulation or alteration is performed, but these problems are also present with traditional photographic images. It is just that the advent of computers has made some of the manipulations easier and the data bases larger, so that the problems have become more evident. There is hope that powerful "Query by Image Content" methods will make it possible to search for similar images by providing an example. This is already working in a limited way with facial surveillance images.

For document imaging, there are some specific recommendations that can be made. First, the resolution of the digital cameras that are commonly available for close-up imaging or attachment to a microscope is considerably less than that of film. Very high-end digital cameras (costing in the thousands to tens of thousands of dollars) have spatial resolution that is beginning to challenge film. A 35mm negative has the equivalent of 10-20 million pixels. High-end consumer cameras are advertised as having arrays of a few million pixels, but the manufacturer really means the number of transistors present as separate light detectors.

Because filters are placed in front of the detectors to capture color images, the effective resolution of the captured images is only about half of the implied resolution (e.g., in the commonly used Bayer filter pattern, one quarter of the pixels receive red light and one quarter receive blue; the red values at locations where there is no red sensor are estimated by interpolation). In other words, the captured images are recorded with empty magnification (more stored pixels than real resolution) and can in fact be reduced in size without loss of real detail.

More important in some applications, particularly crime scene recording where the lighting is often poor, or microscopy where the range from brightest to darkest values can be large, is the limited dynamic range of the digital camera. Film can easily capture 3000-4000 shades of brightness, and a wide gamut of colors. Digital cameras typically record no more than 256 shades of brightness (and may be even worse than this if inexpensive technology such as CMOS chips are used instead of CCDs). For some technical applications requiring the capture of large dynamic range images, such as dark field microscopy and astronomy, cooled cameras are used with great success (actually surpassing film), but these are expensive devices and not at all portable.

Of course, any digital camera, even the least expensive, is likely to be better than the use of a video camera connected to a "frame grabber" or analog-to-digital converter in a computer. These devices were widely used at one time because of their convenience and low cost, but both the spatial resolution and dynamic range, as well as the difficulty of stabilizing them to obtain consistent results, make them very inferior to digital cameras. A good quality video camera

produces an image with far less than 100,000 pixels of real resolution, and a brightness resolution of about one part in 60 (although the image is still conventionally stored in the computer with values from 0 to 255, a considerable part of the variation is random noise).

### **Image capture and storage**

The biggest problem with digital cameras is the storage of the image. Most consumer and prosumer cameras default to JPEG (Joint Photographers Expert Group) compression, in order to fit more images into the comparatively expensive on-board memory. The less expensive models do not even offer storage in a lossless format that preserves all of the information captured by the chip. Unfortunately, while JPEG compression is quite useful for recording surprisingly small files (especially useful for internet transmission) that retain enough detail for human recognition of familiar objects and scenes, it is very flawed for technical and forensic purposes.

A "lossy" compression method, JPEG intentionally discards details that are considered of little use to human vision. For example, the color information in the image is immediately reduced to one quarter of the spatial resolution of the brightness values, because people don't seem to mind if colors bleed across edges (like children who don't color inside the lines). Then fine details are lost, edges are shifted, and other changes are made. And this is done selectively in those portions of the image that had the most information to begin with - in areas where there was little detail, even the random noise in the image may be preserved. This makes it very chancy to depend on the images or to testify about what they do or do not show, as some forensic experts have found to their chagrin.

Other lossy compression methods (based on fractals or wavelets) have the same problems. The only practical solution is to store images in a lossless format. For some cameras this is a proprietary RAW format that preserves all of the data but needs special software to read. For others, a standard computer file format such as TIFF (Tagged Image File Format) is available, which has the advantage of being readable on practically every computer platform and by a broad range of programs. These files are much larger than a compressed JPEG file (so that they do not have to discard possibly important detail), and so it is necessary to have more memory in the camera (usually removable nonvolatile ram in one of several physical forms), or to transfer the images to a computer. (Note - the TIFF format includes provision for a lossless compression called LZW that does not discard any detail but also does not produce very significant reductions in file size.)

With any camera, it is of course important to obtain good quality pictures. Many inexpensive digital cameras have quite poor optics, producing distortion and vignetting (darkening) at the edges and corners. Higher end cameras have better optics, or allow the use of interchangeable standard optics, particularly important for close-up photography or for attachment to a microscope.

Two cameras have proven to be very useful. One is a Nikon 990, a very compact and easily transportable consumer camera that does a reasonable job of close-up photography, can be easily adapted to fit on the eyepiece of a standard microscope, and saves images as TIFF files. The disadvantages are extremely short battery life, some distortion and vignetting (especially in

close-ups), and very little control over the exposure settings.

Another useful camera is a Polaroid DMC le, which is primarily intended for attachment to a light microscope. Because it is fitted with a standard C mount, it is also used with macro lenses (originally purchased for a 35 mm camera). The camera has no memory, but is used connected to a laptop computer, which controls the exposure and records the images (in TIFF format). This setup is obviously less portable, but gives far higher resolution and dynamic range, greater color constancy, and much more control.

With both cameras, it is important to provide uniform and constant illumination. A ring light attached to the macro lens is optimal for most purposes. With the Nikon, getting good illumination (particularly for close-ups) is often difficult (and it is important to turn off the built-in flash, which perversely refuses to remember that it has been turned off). Taking images with an undistorted perpendicular view of the surface is important but requires some care and practice unless a copy stand is used. At least, it is immediately apparent if a poor image has been captured (e.g. with non-uniform illumination, or blur due to out-of-focus optics or motion). The photographer can discard it and retake another.

When images are being taken through a microscope, the magnifications are fixed by the various objective lenses and can be measured once and for all. For other close-up work, including an appropriate scale is recommended so that the sizes of features can be determined if needed, and different images can be properly compared at the same magnification. The scale

can also incorporate color swatches if needed to compensate for the effects of changes in illumination on feature colors, again to facilitate comparison.

A rather recent development is the availability of relatively inexpensive microscopes intended for the educational market that incorporate built-in digital cameras that connect directly to a computer. Having no eyepieces for direct viewing, and no on-board memory, reduces the cost dramatically. Some provide flexible illumination including transmitted and incident light, polarized light, etc. The images from these microscopes are often quite good and the magnification range (typically from about 10 to a few hundred times) covers most of the needs of document imaging.

Often overlooked, another valid choice for document examination is a flat-bed scanner. These are now commonly available with lateral resolution (real optical resolution, not the interpolated phony resolution with which an image may be stored) of 600-1200 points per inch. When viewed on a typical computer monitor or printed out, this produces magnifications of up to 10x, less than a microscope but better than close-up photography in most cases. The scanners must be used connected to a computer, and are generally too large for convenient portable use, but provide convenience, uniform lighting (except right at the edges), very good color correction and dynamic range, known magnification, and distortion-free images.

#### **Image processing and enhancement**

Of course, a primary reason that people turn to digital imaging is the possibility of using image processing for enhancement. Concern is

sometimes voiced that this can introduce opportunities to inappropriately manipulate or even falsify evidence, but with proper control and the ability to compare the results to the original images (which of course must be preserved in a traceable, unaltered form, for instance on a writable CD with a serial number) and to the original documents, this is not a serious problem.

In fact, the most common enhancement techniques are no different in result from procedures long used in darkroom photography, and well accepted. For example, the dynamic range of a film negative is much greater than can be printed onto paper. The darkroom technician adjusts the exposure time, the development, and the selection of paper hardness, to reveal the details in the original image that are considered important, while suppressing other detail that is not relevant.

The same process is performed in the computer by manipulating the contrast of the image, either linearly or nonlinearly. This is more convenient than working with exposure and chemistry but has the same goals and the same limitations.

Some of the range of contrast must be compressed in order to expand other contrast. Sometimes this is done for the entire image, and sometimes it is applied differently in bright and in shadow areas (just as a photographic print can be dodged and burned to bring out detail in shadows).

Figure 1 shows a simple example, a fingerprint on a magazine cover. In the original image the friction ridge markings are not visible on the dark regions. Manipulating the contrast and gamma settings reveals them, albeit at the expense of those on the light areas. Combining

the various regions shows the fingerprint everywhere but suppresses the contrast in the printed background (the magazine cover).

In addition to simple emulations of darkroom procedures, computer processing also opens up

some new avenues for revealing detail. For example, as shown in Figure 2, local contrast enhancement can be used to extract the detail simultaneously in all parts of the image. A small neighborhood (a 15 pixel-wide circle in the

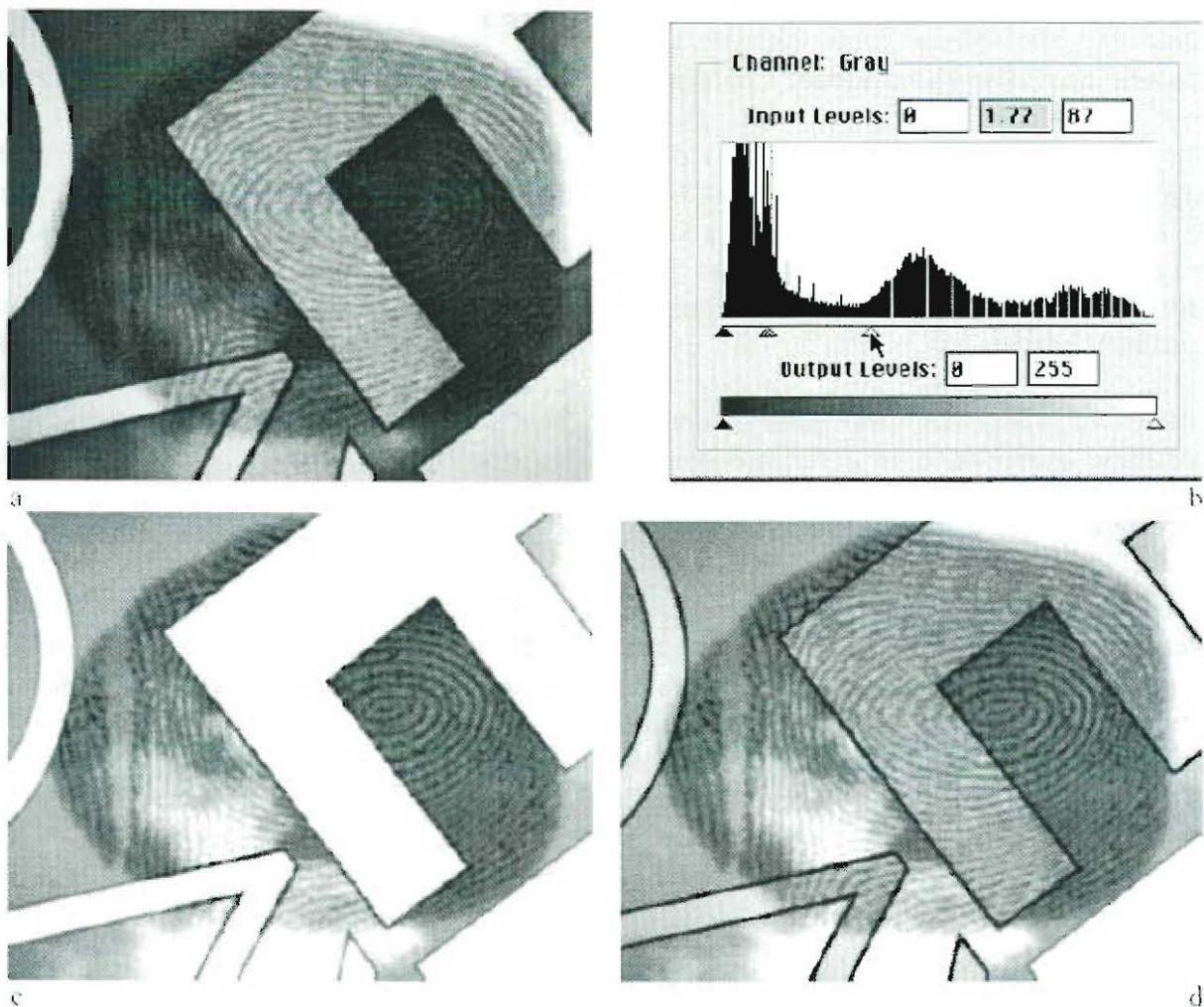


Figure 1: Fingerprint on a magazine cover: a) original image; b) adjusting the contrast (limits and gamma) in Adobe Photoshop® to reveal the details in the dark areas; c) result of the adjustment in b; d) combining the original image in the bright areas with the newly revealed detail in the dark areas.

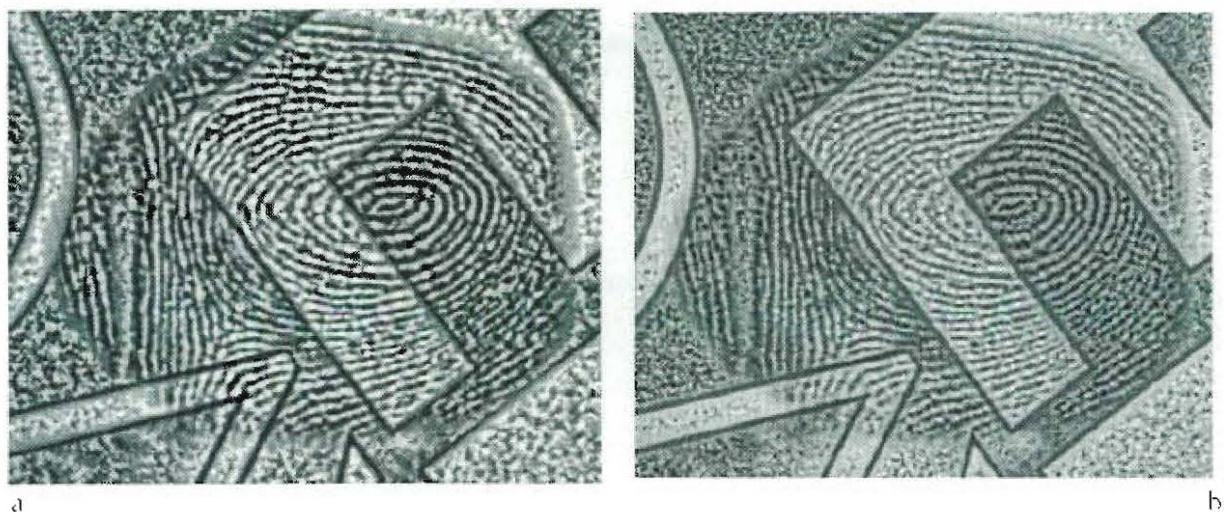


Figure 2. Local or neighborhood enhancement of the image in Figure 1a: a) Adaptive histogram equalization (using a Photoshop plug-in downloaded free from <http://ReindeerGraphics.com>); b) Constant variance equalization, using a plug-in from the Fovea Pro software at the same web site.

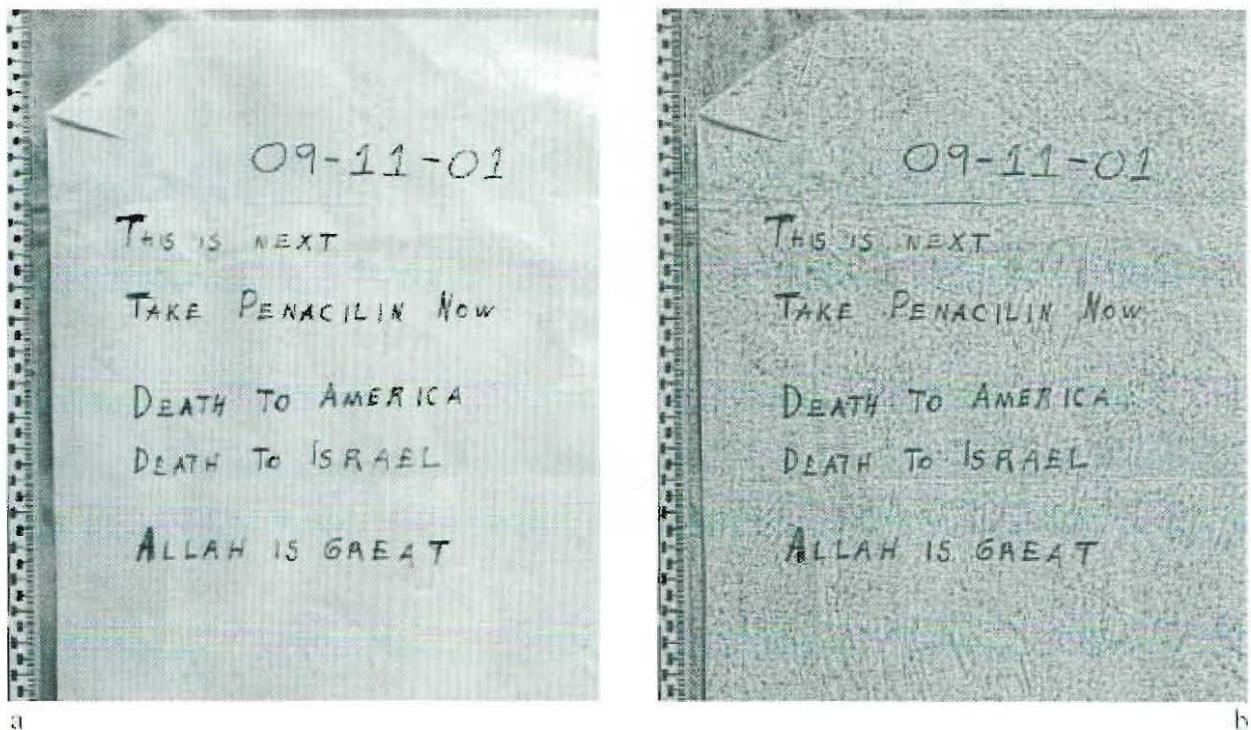


Figure 3. The Brokaw anthrax letter: a) original, photograph provided by the FBI and scanned into the computer; b) subtle markings made visible by local enhancement.

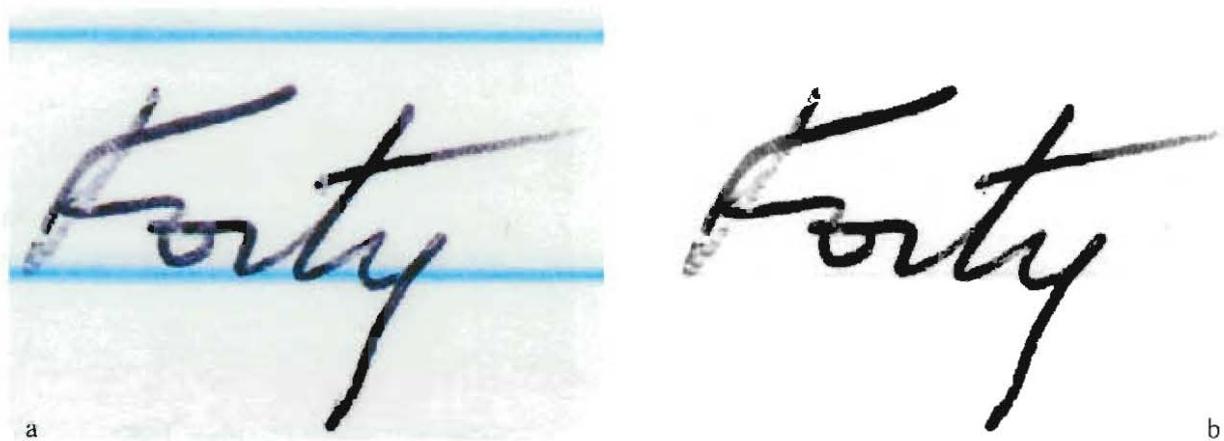


Figure 4. Scanned image of ball-point pen writing: a) original; b) use of a color filter to remove the blue ruled lines.



Figure 5. Scanned image of writing and a fingerprint: a) original; b) use of hue filtering to remove the writing to show the fingerprint.

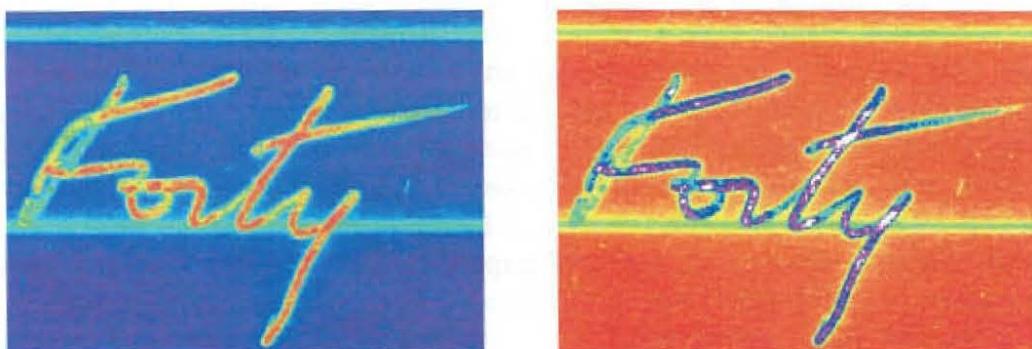


Figure 6. False-color display of the handwriting in Figure 4, using two different color tables.

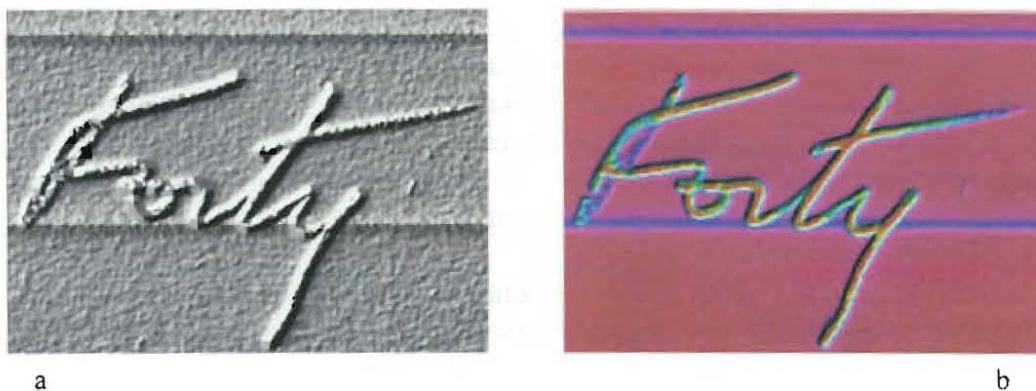


Figure 7. Rendered surface relief of the handwriting in Figure 4: a) Phong rendered (reflectivity and the orientation of the light source can be adjusted); b) combination of rendering with false color encoding of elevation.

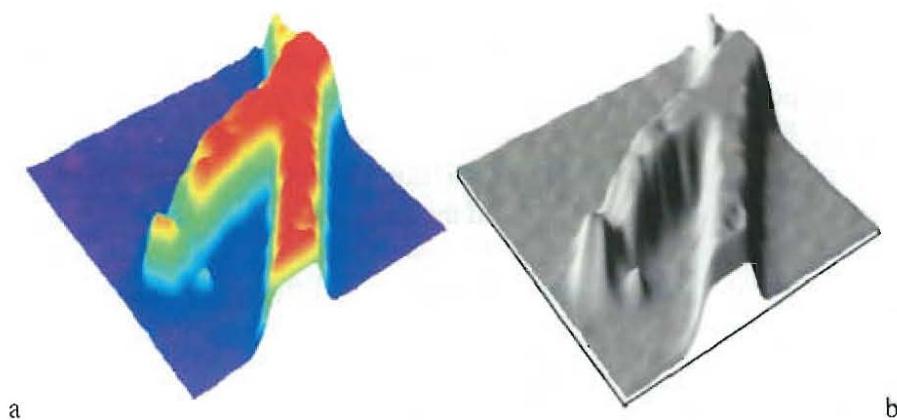


Figure 8. Isometric rendering of the top of the "t" from Figure 4: a) color representing elevation; b) rendered surface shading.

example) is moved across the image and the pixel values are used to compare the contrast between each pixel and its surroundings. In a process called adaptive equalization, pixels that are darker than their surroundings are made darker still, while ones that are lighter are made lighter still. The second example alters local pixel values to make the local variance equal across the image, also enhancing the visibility of detail with somewhat better suppression of random noise. These tools are especially effective for revealing tool marks on firing pin indentations and shell casings, for example.

There is always danger in performing such enhancements. Every image contains some slight variations in color or brightness that may arise from random camera noise, or inconsequential variations in lighting, paper, etc. Once magnified by processing these become visible and may be subject to misinterpretation. Figure 3 shows images of one of the now-famous anthrax letters (the one sent to Tom Brokaw, although the following remarks apply to all of them and to their envelopes). The subtle shadings and "marks" are in fact folds and wrinkles in the paper, stretch marks in the plastic bag holding the still-contaminated letter, and powder residue left by evaporation of moisture inside the bag, not the secret writing and cabalistic symbols imagined by some persons who contacted me a few months ago. They apparently had obtained the images from the FBI under the Freedom of Information act, performed some processing and reacted to the marks as their own private Rorschach test, and were in the process of setting up a web site to disseminate their findings because the FBI was not receptive to their theories.

Color images provide many opportunities for computer processing. For example, the computer can simulate the effect of placing any colored filter between the sample and the camera, a standard method for increasing contrast for one color or removing another one. In the illustration of Figure 4, the color of the ruled lines on the paper was "picked up" with the Photoshop eyedropper and used to generate a filter corresponding to about 490 nm (slightly to the green side of blue), which removes the lines from the image.

More advanced color filtering by separating the image into hue, saturation and luminance channels and using ratios of one color to another can also be used to enhance or suppress details of different colors. In Figure 5 the writing is removed to show the fingerprint.

Many forensic applications, including document examination, rely on the expertise of skilled experts who perform visual examination. One important role that computers can play is to improve the ability to visualize the important details in an image.

The human visual system is not very sensitive to changes in brightness, such as the darkness of ink in lines of handwriting. A local change of about 2% in absolute brightness is the threshold of visibility, which leads to the facts that human vision is essentially logarithmic in its response to brightness (digital cameras are fundamentally linear), and that no more than about 30 shades of grey can be visually distinguished in an image. Since hundreds of different colors can be distinguished, one common visualization technique is to substitute colors for brightnesses. The resulting false-color or pseudo-color image

makes it easier to compare values that are not immediately side-by-side, or to see small changes that occur. This can facilitate the visual examination of changes in the amount of ink at the start or along the extent of a line, and the detection of striations that indicate the direction of hand motion, for example. Of course, the choice of colors is entirely arbitrary as shown in Figure 6.

While this type of color rendition may be useful, it does not take full advantage of the characteristics of human vision. As noted above in connection with JPEG compression, human vision does not easily detect color changes (particularly in the green portion of the spectrum). But we have great experience in judging the geometry of surfaces, which constitute most of the real-world images encountered. Treating the brightness of points in the image as representing elevation allows rendering the image as a pseudo-surface. This can be displayed as it would appear with light falling on it at any desired angle (and with variations of the surface albedo from diffuse plaster of Paris to reflective metal). Figure 7 shows an example of surface rendering using a Phong model, and the combination of surface rendering with false color.

In the examples above, the surface image is still viewed perpendicularly. Interpreting the pixel brightness as elevation also allows displaying an isometric view from some other orientation. In Figure 8, the cross bar on the "t" in Figure 4 is shown in this mode, using different shading modes. Small irregularities in brightness are very evident in these displays.

There are many other specific types of image processing that can be used for enhancement of the ability to visualize details, not all of which

can be shown here. One such method is the removal of periodic patterns (e.g., to better reveal writing on a woven fabric) using Fourier transform filtering. Other applications of processing are rectification of images taken with a non-normal point of view, or correction of color variations resulting from variable illumination. Computer-based image analysis includes making measurements on images.

### Conclusion

Mastering the techniques for these new tools requires some practice. Like any set of tools, if you do not use them regularly or understand what they do, you will not get optimum results. But if you spend a few hours every week you will find that the reward is superior results in less time than traditional methods. Details on all of the methods shown here (and many more) can be found in *The Image Processing Handbook*, 4th edition, 2002, CRC Press, isbn 0-8493-1142-X, and their applications to forensic images are shown in *Forensic Uses of Digital Imaging*, 2001, CRC Press, isbn 0-8493-0903-4, both by the author. The software used for the examples shown is Adobe Photoshop (Adobe Corp., [www.adobe.com](http://www.adobe.com)) with the Fovea Pro image processing package (Reindeer Graphics, [www.ReindeerGraphics.com](http://www.ReindeerGraphics.com)).

*Dr. John C. Russ is an expert in image processing and analysis who has taught courses and workshops around the world, consulted for hundreds of industrial clients, and provided expert testimony in many civil and criminal cases. A Caltech graduate, he was senior vice president of EDAX International in Chicago, IL, and Research Director of Rank Taylor Hobson in Leicester, England. Since 1979 he has been a Professor in the Materials Science and Engineering Department at North Carolina State University. His Image Processing Handbook (CRC Press) is now in its third edition and is recognized as a worldwide standard reference text.*

## THE UNITED KINGDOM'S CIVIL PROCEDURE RULES ("CPR")

by

Maureen Ward-Gandy, CDE

**THE CIVIL PROCEDURE RULES** known as CPR, arose from a report by Lord Woolf, Master of the Rolls, to the Lord Chancellor. Lord Woolf expressed his vision of a more expedient and fair procedure in the Civil Justice System of England and Wales. His paper, *Access to Justice* (interim June 1995; final July 1996) inspired legal authorities to consider reforms which were implemented by the *Access to Justice* Act 1998. The Civil Procedure Rules were introduced by statutory instrument in 1998 and brought into force in April 1999. It is to the benefit of American document examiners to understand the new procedures because historically, the American legal system has been based upon the legal system in the UK.

**NADE's 21<sup>st</sup> CONFERENCE** was the first held outside USA and hosted by this author in the UK. A mock court trial was NADE's oral examination for certification. USA candidates adapted well to CPR by complying with required declarations in comprehensive reports with explicit evidence. In a realistic court scene with two barristers in legal attire and eminent Sir Michael Davies as presiding judge, candidates quickly adjusted to formal presentation in high-court atmosphere and addressing Sir Michael Davies as 'My Lord'.

**ADVERSARIAL REFORMS:** Basically the Adversarial System exists in the UK's criminal & civil courts; each with an individual route from initial hearing to further trials, verdict,

settlement and/or appeal. The Criminal System is being reviewed for similar reform as CPR, but under Sir Robin Auld's guidance. His report *Review of Criminal Courts of England & Wales* was published in October, 2001. The Government's White Paper, *Justice for All* includes many of Sir Robin Auld's recommendations, yet reveals little about expert witnesses. The Government proposes to introduce legislation in the forthcoming Parliamentary session. The Expert Witness Institute (EWI\*) governors will keep members informed of any reforms in the Criminal System

**USA/UK VARIANCE:** American criminal case procedure is similar to that of the UK, except that case titles, such as *Regina-v-Blogg* (Crown-v-accused) contrast with the USA's *State-v-Blogg* (An American State-v-accused). Lawyers (UK barristers or USA attorneys), who are called counsel, present their case in criminal court with a jury guided by a judge, who decide if the accused is "guilty or innocent beyond a reasonable doubt." The accused is "innocent until found guilty." The Inquisitorial System which operates in Europe is more concerned with establishing "the truth based on the balance of probabilities."

**CIVIL JUSTICE** cases comprise a legal action by one party against another for multifarious reasons, through different court levels & routes. Counsel argues a party's case with verdicts decided by a judge alone on "the balance of probability." (Counsel is usually appointed by a solicitor or retained by the client, and it is the solicitor who instructs an expert witness and

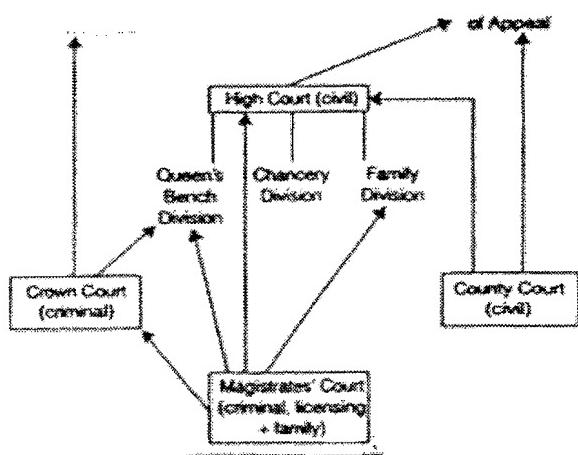
---

\* Expert Witness Institute – the UK's leading organisation promoting Expert Witness proficiency.

obtains all the necessary evidence.)

CPR concentrated on improving the Civil Courts beyond the reforms of the past 20 years. Lord Woolf wished to ensure that "justice was accessible to all" – which meant eliminating any form of deviousness or "hired gun" expertise. CPR case management is now firmly in the hands of the judge who will set the timetable to which the parties must adhere.

Below is a broad overview of the UK Court System – without its various tribunals:



**CPR APPLIED:** Counsel represent opposing parties by arguing their merits with both sides having help from factual and opinion witnesses. Each side may cross-examine the opponent's witnesses with an aim to reveal the truth. Where two opposing experts' reports show different findings and results, (to be effective, it is essential to have an clear agenda which may be constructed by the experts with guidance from the solicitors) the court requires the experts to meet for debate with the aim of "narrowing the differences" for a more balanced conclusion. This is then shared with both parties for presentation to the court – thus saving time and costs.

**Expert Witness' Role** is as an "independent specialist" to explain clearly to the court all aspects within their expertise to help the court to decide fairly. CPR constantly emphasizes the essential observation that:

"Expert witnesses have an overriding duty to serve the court, irrespective of who may instruct them or pay their fees. Expert witnesses cannot act on a contingency fee basis." (An expert witness may not be used as a "hired gun.")

**SINGLE JOINT EXPERT (CPR 35.7)** The old system of using separate experts for each side has changed under CPR in favour of using one expert only, instructed jointly by all parties involved (who should share equally the expert's fees). The main reason for CPR reform was the injustice that occurred through delay, excessive expense and partisanship.

**COMPREHENSIVE REPORTS:** To comply with the duty to help the court, all expert witnesses' forensic reports must be comprehensive and comprehensible enough to "stand alone," by concealing nothing and with illustrated explanations. Brief statements are unacceptable under CPR 35 requirements.

**The Ideal Report:** A properly prepared CPR report should have a clear title, case number, court and solicitor listed, and an index that is easy to follow in agreement with pagination. An introduction must cover relevant matter with an official declaration followed by pictorial evidence of items examined. The method adopted must be described, and all tests must be explained with findings illustrated. Any research used, with results, should be defined. The report should be firmly bound. Finally, "a

range with reasons of opinion reached" with the required statements of "compliance and truth" must be included.

The following is a suggested format published in EWI's Spring 2002 Newsletter. It was composed as a guide for experts to include in forensic reports. CPR 35 requires that an "Expert's Declaration" is appended to reports in all civil cases to ensure experts direct their opinions only to relevant issues therein.

### **Expert's Declaration**

1. I understand that my overriding duty is to the court, both in preparing reports and in giving oral evidence. I have complied and will continue to comply with that duty.
2. I have set out in my report what I understand from those instructing me to be the questions in respect of which my opinion as an expert is required.\*
3. I have done my best, in preparing this report, to be accurate and complete. I have mentioned all matters which I regard as relevant to the opinions I have expressed. All of the matters on which I have expressed an opinion lie within my field of expertise.
4. I have drawn to the attention of the court all matters of which I am aware, which might adversely affect my opinion.
5. Wherever I have no personal knowledge, I
6. I have indicated the source of factual information.
7. Where, in my view, there is a range of reasonable opinion, I have indicated the extent of that range in the report.
8. At the time of signing the report I consider it to be complete and accurate. I will notify those instructing me if, for any reason, I subsequently consider that the report requires any correction or qualification.
9. I understand that this report will be the evidence that I will give under oath, subject to any correction or qualification I may make before swearing to its veracity.
10. I have attached to this report a statement setting out the substance of all facts and instructions given to me which are material to the opinions expressed in this report or upon which those opinions are based.

I confirm that insofar as the facts stated in my report are within my own knowledge I have made clear which they are and I believe them to be true, and the opinions I have expressed represent my true and complete professional opinion.

Signature \_\_\_\_\_

Date \_\_\_\_\_

\* The point of this is to ensure that the expert is directing his/her opinion to the relevant issues. Experience shows that unless this is done, much time can be wasted on the wrong question.

**Guidance Notes:**

1. The declaration should be considered carefully by the expert. Signing is not a routine matter. If any part of it requires modification for an individual case, it should be modified accordingly. Thus in some cases, an expert's instructions may limit the scope of the report and paragraph 2 may require modification accordingly.
2. The declaration is appropriate only for civil cases.
3. The declaration is not about ethics, but about responsibilities.
4. The declaration is only appropriately associated with the final report for exchange.
5. The declaration should be served as an appendix to the final report.

**CPR REVIEWED:** Expert witnesses and their evidence have been probably the more challenging areas of concern during the formation of CPR 35. Identifying the right expert was invaluable, but had in the past become an excessive cost by delay, and sadly injustice resulted from inappropriate use of wrong or partisan experts.

**TRAINING:** Efforts were made to train experts into operating in their true duty to "assist the Court rather than justify the need of whichever party was paying them." After over two years of operating under CPR, courts today have stronger control over expert evidence and permit it only if there is a perceived "need for specialist knowledge." Judges still pay special attention to expert evidence and must express their reasons for preferring one expert's evidence over another's.

Through Lord Woolf's noble vision, competent

training by Bond Solon Ltd,\* and excellent expert guidance from the Expert Witness Institute, the new Civil Procedure Rules came in like the cavalry to promote *Access to Justice* in the UK.

**BASIC ROLES OF FORENSIC OPERATORS:**

**UK SOLICITORS** are not equivalent to USA paralegals. They study to a law degree and provide extensive services to whomever needs legal advice. They are responsible for complete case management on behalf of their client, and act as liaison between client, counsel, expert and court for the final negotiations. Solicitor firms are registered and monitored by the Law Society, which is their professional body.

**Aim:** The solicitor's role (unlike the wholly impartial expert) is to help the client to succeed and win the case in whatever legal process the client is involved, but as an officer of the court, a solicitor has a duty to the court to behave ethically.

**BARRISTERS** are a unique British breed. They are fully conversant with most aspects of law and litigation. They are experts in eloquent rhetoric speech and are self-employed independents, operating from "chambers" which are shared with other barristers and students. Solicitors select and instruct barristers to give advice on legal procedure and to represent their clients in all courts. Barristers hold pre-trial conferences in the chambers with clients and solicitors to discuss case issues and with expert

---

\* Catherine Bond & Mark Solon are qualified US & UK lawyers who created Bond Solon Training Ltd and have trained over 75,000 expert witnesses over the past seven years

witnesses to review report evidence for presentation.

**Aim:** A barrister's role is as court advocate aiming to discover the truth if possible, but primarily to succeed – with the court finding in favour of his/her client(s).

**EXPERT WITNESSES** must ensure their primary duty is to help the court understand all implications, case details and how and why they reached their conclusions. The expert should avoid technical jargon in reports and testimony, and give explicit illustrations and clear results. Expert witnesses must never be tempted to stray outside their field of expertise

**Aim:** An expert's role is to present well-illustrated evidence which helps courts decide justly and expediently, and not to "win" for his/her client.

**THE (CPR 35-7) SINGLE JOINT EXPERT:** Since the launch of CPR 35.7 which covers the use of Single Joint Experts, one expert witness is instructed by both parties to examine the evidence and provide a comprehensively illustrated report for each instructing or opposing solicitor (usually two solicitors). The aim of the Single Joint Expert should be to show how and why the results emerged in order to help the court reach a "just and expedient verdict".

**SOLICITORS** involved are expected to obtain all documents possible to help the SJE prepare a proper report. If questions about the report arise, questions may be sent to the expert who is required to answer in a given time. It is unusual for a SJE to be asked to give oral evidence in Court, but if this happens, a list of issues to be

raised should be sent to the expert before Court hearings. Solicitors are expected to share the expert's costs.

**EMERGING FINDINGS:** A report from the Lord Chancellor's Department highlights the Single Joint Expert as one of seven "key new features" of CPR. It says, "A desire to save time and costs in a manner which is proportionate to the issues of the case was the impetus behind the use of Single Joint Experts."

**A "CODE OF GUIDANCE ON EXPERT EVIDENCE"** was produced in December 2001 by the Working Party established by the Head of Civil Justice. This booklet gives a detailed guide for expert witnesses and solicitors instructing them, and as such, supplements CPR (Part 35) and its Practice Directions.

**Factual Events:** In "fast-track cases" there is an indication that Single Joint Experts will be more the rule than the exception. Lord Bingham said, "There was everything to be said for Single Joint Experts when the expert issue is 'relatively uncontroversial and on the periphery of the case', but it may be more difficult in any issues that are 'highly controversial and central to the case.'"

In very complex cases where a Single Joint Expert is introduced at the case's outset, the case controllers may use another individual expert at their expense in addition to the SJE. Such an expert is called a "shadow expert" and is not subject to the "overriding duty to the court."

**FINAL REVIEW:** The Lord Chancellor believes that the Single Joint Expert System is working well. One of his reports concluded,

"The use of Single Joint Experts appears to have worked well. It is likely that their use has contributed to a less adversarial culture, and earlier settlements and may have cut costs."

**NB: Information was gathered from *The Expert Witness in Court* by courtesy of authors, Catherine Bond & Mark Solon: Also from Brian Thompson of The Expert Witness Institute.**

*Maureen Ward-Gandy, CDE, is a Bachelor of Education (B. Ed -London University, UK). She has both USA & UK experience & qualifications, being certified as a Forensic Document Examiner and Diplomate of NADE, a Diplomate, Fellow and Overseas Agent of ACFE, and a Fellow of UK's prestigious Expert Witness Institute.*

*Maureen completed Bond Solon and the Expert Witness Institute Basic Law and Courtroom skills training successfully to be a court recognised CPR.35-7 Single Joint Expert since the outset. She scored 100% in the forgery detection part of Australia's LaTrobe University D. E. Proficiency Examination.*

*Her practice has a fully-equipped forensic laboratory plus 'MICS' (USA 3-D creation) and is accredited with international quality standards 'ISO 9001'. Foreign alphabet study increases her overseas cases and over 22 years she has testified in the whole hierarchy of civil and criminal courts.*

*Sharing regularly the presentation of research papers at US & UK conferences updates her forensic knowledge, the highlight being NADE 21st Annual Conference held for first time outside USA which was planned and hosted by Maureen and her husband. Attending delegates graciously said they enjoyed its excellence.*

## HANDWRITING RESEARCH – CAST A WIDE NET

by

Marcel Matley

Some med/psych journals regularly have papers in some way related to handwriting. Complaints that scientific research into handwriting production and identification is lacking are more readily put to rest, and the examiner's knowledge is greatly increased, if a wide net is cast in public, legal and medical libraries. Below are some citations that illustrate the importance of handwriting in occupational therapy and thus in occupational activities, and that also indicate that handwriting can be an excellent barometer of difficulties other than with writing itself.

When surveying journals of this nature, one stumbles on things an indexing service would not find. Such are the two items which reproduce actual handwriting of children in another journal. In one, several disabled children were writing to say how an article by a disabled man encouraged them. A citation which does not prove out for the intended purposes at a given moment, such as the first item below, may be of great value at another time. That one reference might be the key someday to solving a problem.

Most local public libraries have an interlibrary loan service. Investigate the academic and university/college libraries in your general area. Unexpected gems are waiting to be found. For example, in law libraries one might find paleographic materials once given to the library or that the librarians used to represent general

culture in the collection. University of California at San Francisco Med Library has several nice works on that topic. Who would have guessed?

Enjoy perusing this tiny example from a database of several thousand citations, and know you also can start building a database to serve your special interests. By the way, several other journals have far more handwriting materials than this one, though it is above average in coverage.

NOTE: The (I) indicates that the item is included in the QDE Index database. This happens only if there is direct application to problems in forensic work. All items have some indirect application, because any advance in scientific study of handwriting will eventually enrich forensic applications. This examiner's database includes citations to more papers that have not yet been seen than to those that have. The former are included because part of research is collecting citations to things one might want or need to retrieve in the future. This practice also helps to remind one how limited the current state of one's knowledge is, thus engendering intellectual modesty in making claims and forming opinions.

1. AMERICAN JOURNAL OF OCCUPATIONAL THERAPY. 16:141-2, May-June 1962. Intensive stereognostic training. Effect on spastic cerebral palsied adults. Author(s): Ferreri, Joan Ann.

NOTE: The reference given to this paper indicated it might be about handwriting, but upon seeing it I realized it was not related to handwriting. Part of research is going up many blind alleys.

2. AJOT. 42:647-52, Oct. 1988. A description of grip strength in preschool children. Author(s): Robertson, Andrea. Deitz, Jean. NOTE: Though giving no mention of handwriting, it is possible that some case may need evidence that a writing required more grip strength than a preschool child could muster, such as a heavy writing instrument giving deep pressure grooves in continuous writing. This article provides such information.
3. AJOT. 44:736-40, Aug. 1990 (I) Incidence of atypical pencil grasps among non-dysfunctional adults. Author(s): Bergman, Kerstin P. NOTE: Page 737 illustrates seven different grips of the pencil, a thing one might need to explain some day.
4. AJOT. 44:893-900, Oct. 1990. (I) Descriptive analysis of the developmental progression of grip position for pencil and crayon control in non-dysfunctional children. Author(s): Schneck, Colleen M. Henderson, Anne. NOTE: This goes the previous paper three better, illustrating ten grips on page 895, but each gives some the other does not.
5. AJOT. 45:701-6, August 1991. Comparison of pencil-grip patterns in first graders with good and poor writing skills. Author(s): Schneck Colleen M.
6. AJOT. 46:509-12, June 1992. The relationship between elbow position and grip strength. Author(s): Kuzala, Elizabeth Ann. Vargo, Michael Charles. NOTE: Though handwriting is not mentioned, the data are directly applicable. It is a good idea to experiment with what different arm and elbow positions will do to your own writing. Maybe have a group do the same experimental positions and compare results.
7. AJOT. 46:785-92, Sept. 1992. Effects of aging on adult hand function. Author(s): Shiffman, Lori M. NOTE: Though not specifically on handwriting, it surely is informative about the background information we might need in our next exam of a senior citizen's alleged signature.
8. AJOT. 46:898-903, Oct. 1992. Fine motor activities in elementary school: Preliminary findings and provisional complications for children with fine motor problems. Author(s): McHale, Kathleen. Cermak, Sharon A. NOTE: Handwriting is the most common of all fine motor movements we employ. The development of hand agility and skill seems to have direct bearing on development of intelligence.
9. AJOT. 47:919-6, Oct. 1993. (I) The influence of ergonomic factors and perceptual-motor abilities on handwriting performance. Author(s): Tseng, Mei Hui. Cermak, Sharon A. NOTE: Courts have said that experts should explain the causes of the phenomena they observe. In Scholastic Philosophy the very definition of scientific knowledge is knowledge of causes. Courts determine liability, and liability is based on causation. Identification of an agent from the agent's effects (the writer is the agent causing the effect known as handwriting) is based on determining causation by study of the effects, the results. The more we know of the factors affecting the characteristics of handwriting, the less likely we are to mistakenly identify the writer, the agent producing it.
10. AJOT. 48:982-8, Nov.-Dec. 1994. Relationship between visuomotor and

handwriting skills of children in kindergarten. Author(s): Weil, Marsha J. Amundson, Susan J.Cunningham.

NOTE: They conclude most children will be ready to learn how to write by the end of kindergarten. Actually, graphic activity can start a lot sooner, and those who have had children can attest to the strong inclination for graphic activity, as on the newly painted living room wall. Indirectly such research as this also teaches us what can be missing in performance of writing by the visually impaired.

11. AJOT. 49:763-71, Sept. 1995. Development of in-hand manipulation and relationship with activities. Author(s): Humphrey, Ruth. Jewell, Karen. Rosenberger, Robin Cole.

NOTE: Of several activities studied, two were graphic activities though not handwriting.

12. AJOT. 49:772-4, Sept. 1995. Clinical interpretation of "Development of in-hand manipulation and relationship with activities." Author(s): Case-Smith, Jane.

13. AJOT. 50:133-8, Feb. 1996. How forearm position affects grip strength. Author(s): Richards, Lorie Gage. Olson, Bonni. Palmeter-Thomas, Pamela.

NOTE: The bottom line is given on page 138, in the last two sentences: "Knowledge of body positions that afford the strongest grips is needed when designing and spatially orienting equipment that requires a maximum grip to operate. Our results suggest that equipment requiring such a grip should be designed to allow gripping to occur with the forearm in the supinated position." Supination is positioning the hand palm up, while pronation is positioning

the hand palm downward. Writing requires more pronation than supination, and complete supination makes writing impossible. It would seem then that the writing position automatically reduces the grip strength available for the writing task.

14. AJOT. 50:732-739, Oct. 1996. Factors that relate to good and poor handwriting. Author(s): Cornhill, H. Case-Smith, J.

NOTE: This item has not yet been retrieved. Although the title promises information of direct value to us, one cannot evaluate a paper solely by its title. Some with very promising titles turn out to be of little value, and some with very unpromising titles provide critically important information. You do not really know what your Christmas present is until you open it.

15. AJOT. 51:553-61, July-Aug. 1997. Educational participation of children with spinal cord injury. Author(s): Dugeon, Brian J., et al. NOTE: Page 557-558 discusses "Augmentative Writing Aids" and the difficulties these children experienced.

16. AJOT. 51:605-7, July-Aug. 1997. Biofeedback for writer's cramp. Author(s): O'Neill, MaryAnn E. Gwinn, Katrina A. Alder, Charles H.

NOTE: The good results lasted for about a week. Naturally. Handwriting is a habitual activity and only positive habit retraining with disciplined practice will eliminate poor writing habits.

17. AJOT. 52:248-55, April 1998. Test-retest reliability of the evaluation tool of children's handwriting-manuscript. Author(s): Diekema, Susan M. Deitz, Jean. Amundson, Susan J.

NOTE: A study of legibility of first- and second-graders with handwriting dysfunction.

18. AJOT. 52:256-8, April 1998. Clinical interpretation of "Test-retest reliability of the evaluation tool of children's handwriting-manuscript." Author(s): Schneck, Colleen M.

19. AJOT. 54:9-17, Jan.-Feb. 2000. Grip form and graphomotor control in preschool children. Author(s): Burton, Ellen W. Dancisak, Michael J.

NOTE: Concerning how to measure effect of various types of grip on drawing accuracy. By application, manner of gripping the writing instrument will affect ability to make accurately the letter forms intended. They "found" that teaching new grips only helped improve good performance, not bad. However, I think they may not have considered presence of multiple problems in poor performance and that it takes time to overcome entrenched habits of poor performance.

20. AJOT. 54:18-9, Jan.-Feb. 2000. Clinical interpretation of "Grip form and graphomotor control in preschool children." Author(s): Windson, Mary-Margaret.

21. AJOT. 54:83-8, Jan.-Feb. 2000. Perceptual-motor function of school-age children with slow handwriting speed. Author(s): Tseng, Mei Hui. Chow, Susanna M. K.

NOTE: Handwriting is not a single skill. It requires coordinate use of multiple skills, just as it requires the coordinate use of multiple neuromuscular functions. Perception provides continual feedback during the process of handwriting, so that any dysfunction in perception or processing of perceptions will cause dysfunction in handwriting.

22. AJOT. 55:175-83, March-April 2001. Pencil grasp and children's handwriting legibility during different-length writing tasks. Author(s): Dennis, Juli L. Swinth, Yvonne.

NOTE: I have used "grasp" to mean grabbing the pen too tightly, while here it simply means "grip." One has to be sure one understands how an author is using a term. Much misunderstanding, and thus much argument even to the point of antagonism, comes from people using the same word in different meanings or different words in the same meaning and not realizing it.

Here it is in early 2003, which means there are two more years of gems in this journal waiting to be discovered.

*Marcel Matley earned a Master of Arts degree in Library Science before studying handwriting analysis and achieving certification in 1981. That study continues with reading in all aspects of handwriting.*

*In 1985 Marcel formally began full-time work as a document examiner, doing business as A and M Matley, Handwriting Experts of California. He has authored several published monographs and articles and presented classes and seminars and he has also presented at several professional conferences.*

*Marcel's home is in San Francisco, where he has a personal collection of a bit over 6,000 items in forensics and handwriting. With an appointment, both collections are available for on-premises reference use only.*

## THE AUTHORITIES SPEAK OUT ON DISGUISE

by

Kay Micklitz, CDE &  
Barbara Downer, CDE

The following are quotes from some of the authoritative writers in the field of document examination. It has been found helpful to save citations according to topic for easier reference and to find the right information for each situation as appropriate. The proper authority is listed after each cite.

• • • •

“Identification of disguised writing is possible only if the unnatural portions are recognized and properly evaluated, while the undisguised portions are used as the basis of the identification.” Pages 169-70

Ordway Hilton, *Scientific Examination of Questioned Documents, Revised Edition*, CRC Press, Inc., 1993

• • • •

“Originality in disguise is rare. Most disguised writing is relatively simple in nature as the writer tends to focus on changing the pictorial effect of the writing while overlooking the less obvious habits. Document examiners can identify disguised writing because it lacks internal consistency and it frequently appears to be drawn or slowly executed instead of written fluently. It may involve the use of grotesque letter forms.” Page 148

Katherine M. Koppenhaver – *Attorney’s Guide*

*to Document Examination*, 2002, Quorum Books, Westport, CT

• • • •

“When there are suspects and when there is sufficient writing other than the signature, the perpetrator usually reverts to unconscious habit, so that with sufficient standards identification of the writer may be possible.” Page 156

“Disguised writing is pure invention designed to change the appearance of one’s natural handwriting style so as to deceive the recipient and conceal identity of the writer.”

Page 244.

“Defeating the efforts to successfully disguise is the inability of the writer to maintain the fabrication in extended writing because of the many things that must be remembered all at once while the act is in process.” Page 244

“Changing capital letters is one of the prime strategies in disguised writing. A change of these conspicuous letters has an obvious effect on the pictorial appearance of the writing. Small letters receive less attention and usually suffer no greater change than occurs from changing the slant or size. They often remain intact to preserve the highly identifying internal features.”

Page 245

“Two theories of handwriting that pertain to disguised writing should be kept in mind. (1) Automatic or unconscious writing habits usually prevail in disguise to a degree that the writer can be identified. (2) It is possible, however, for a writer to distort his or her natural style of writing to the extent that identification of the writer cannot be made.” Page 246

Edna W. Robertson - *Fundamentals of Document Examination*, Nelson-Hall, Chicago, 1991



"One of the features most characteristic of disguised writing is the lack of consistency throughout the document." Page 289

"Inconsistency is the most important indicator of disguised handwriting. Frequent changes in slant, letter forms, spacing, pen pressure, size and legibility are indicative of the writer's effort to substitute new handwriting characteristics in place of natural writing habits." Page 267

"A person who disguises his or her handwriting is doing an unnatural act. Change of slant is one of the most popular of the disguises. It is the most effective way of changing one's characteristics." Page 290

Russell B. Bradford and Ralph B. Bradford - *Introduction to Handwriting Examination and Identification*, Nelson-Hall, Chicago, 1992



"It is quite difficult for a writer who is concentrating on the subject matter to avoid occasionally falling into his natural habits of writing. These peculiar details do not appear by accident. They are the result of much practice and are an established habit of the writer. Consequently, these personal characteristics, written unconsciously have great weight, and their cumulative power leads to a definite identification." Page 298

"The habit of writing must be the automatic action set in motion by the initial impulse which

highly individualizes the character of writing and is so strongly established as to become inflexible and involuntary. Indicated by characteristics appearing in the writing, this natural factor is difficult to suppress and conceal in intention, disguise or substitution by use of different instruments and materials." Page 51.

"A person intentionally may change the formation of some letters or, through the use of inferior materials, he may distort his handwriting so that it is almost illegible and unrecognizable, but even under these conditions identification can usually be made. The writer does not know which letter to change to hide his personality. His fixed habit controls his style." Page 52.

J. Newton Baker - *Law of Disputed and Forged Documents*, The Michie Company, Charlottesville, VA. 1955



"In disguised writing the writer seeks to impart an appearance as unlike his own habitual writing as possible, and yet have the disguised writing legible. In imitated writing, the writer seeks to reproduce, as perfectly as possible, the habitual handwriting of another person. The effort at disguised writing fails from the inability of the writer to avoid his own unconscious and habitual characteristics." Page 94

"In imitated writing, the writer fails from a two-fold cause. He can neither avoid all his own unconscious habits, nor reproduce all those of the imitated writing; nor can he assume the unhesitating and natural facility with which natural writing is executed." Page 94

Daniel T. Ames, *Ames on Forgery, Its Detection and Illustration*, The Boston Book

Journal of The National Association of Document Examiners, Inc.  
Company, Boston, Mass.



"Revealing identities in the form of subconscious individual writing habits will not show in the appearance, but will show up in the details. The writer, unacquainted with his own subconscious writing habits, frequently leaves his own primary characteristics in the disguised writing." Page 44

Hanna F. Sulner, *Disputed Documents*, Oceana Publications, Inc., Dobbs Ferry, New York, 1966.



"Where more than a few lines of disguised writing have to be written, the intense concentration which is essential for the maintenance of any complicated scheme of disguise is beyond the capability of the average person." Page 351

"Apart from the relaxation of the disguise, which is usually characteristic of the latter part of a passage and which is due to the writer becoming tired, with the consequent loss of concentration, certain portions of a disguised document can be counted on as having been much less thoroughly disguised than others." Page 369

Wilson R. Harrison, *Suspect Documents, Their Scientific Examination*, Nelson-Hall Publishers, Chicago, 1981



"The mannerisms and individualistic gestures of our manuscript, by reason of the semi-automatic

nature of the brain-control over letter formation become, like all other mannerisms, subconscious and unnoticed after a short time. Handwriting apart, it is an admitted fact that the more ingrained the physical gestures of an individual become, the less conscious of them he is." Page 6

Captain Arthur J. Quirke, *Forged, Anonymous, and Suspect Documents*, George Routledge & Sons Ltd., London, 1930.



"That which is obvious and superficial is disguised while that which is done less consciously and is less conspicuous is usually overlooked. When delicate inconspicuous parts of a writing are executed consistently on repeated occasions, and especially if they are written freely, it is safe to conclude that they are elements that are not disguised." Page 279

"The length of the signature and the space available to execute it had no significant affect upon the method of disguise employed." Page 281

Roy A. Huber and A.M. Headrick, *Handwriting Identification: Facts and Fundamentals*, CRC Press, Boca Raton/ New York, 1999



"The favorite disguises adopted in anonymous letters are, a change of slant, a different size and proportion of writing, the printing of the communication instead of putting it in ordinary script, the use of a different kind of pen from that ordinarily employed, and the invention of

certain fantastic forms which may give a very different superficial appearance to a page of writing.

As already observed, the most significant characteristics are usually not disguised in the least for the simple reason that the average writer, with his inadequate knowledge and superficial study of the subject, is unable to recognize the peculiar and significant characteristics in his own writing as compared with writing in general. He does not know what a handwriting characteristic is.

It is rare indeed that the disguise adopted is more than superficial, and in most cases it covers only a small number of the characters employed and but few of the habits exemplified. A change in the slant and a change in a few of the forms of the capital letters are often the only disguises attempted and while these few repeated changes may affect the general appearance of writing in a pronounced manner it is easily seen that the bulk of the writing in a letter thus written remains practically undisguised." Page 407

If delicate, inconspicuous parts are consistently repeated and especially if they are written freely, it is safe to conclude that they are not disguised.

Pages 416-17

Albert S. Osborn – *Questioned Documents* 2<sup>nd</sup>  
Printing, Nelson-Hall, Chicago, 1929

seldom fulfilled. But assuming that it has been accomplished, for it is certainly within the reach of a clever individual who is willing to use every means at hand to avoid detection, then the second, more difficult step still lies ahead. This is the task of eliminating the identifying habits of his writing and adopting an entirely new set. Writing habits are very strong, and serious difficulties are encountered in any attempt to discard them. The usual result of these attempts is to eliminate effectively prominent characteristics but to leave numerous unconscious, but individual, writing traits. What is then believed to be an effective disguise actually is filled with these small but significant personal habits which frequently permit an identification of the writer." Page 152

Ordway Hilton – *Scientific Examination of Documents*, 1956, Callaghan & Company, Chicago, 1929

• • • • •

*Disclaimer: This list is not intended or claimed to be a total and all-encompassing listing of all references to disguised writing by the referenced authorities, but is presented for your convenience and possible use and or research in the field of document examination.*

• • • • •

"Just why is disguise so difficult, and what is it that causes so many attempts to fail? To be successful the writer must carry out two difficult steps. First he must have a thorough knowledge of the identifying details of his writing and the significance of each. This condition alone is

## A PAPERLESS SOCIETY?

by

Phyllis Cook, CDE Emeritus

It seems as man progresses in this quickly growing world of computers, facsimile machines and plastic money, handwritten documents are decreasing. This causes a legitimate concern to forensic document examiners.

First, focus on the effects of diminishing check-writing because canceled checks are priceless standards for the document examiner. They are handwritten, dated, and signed. They contain numbers. They are written nonchalantly, unlike request-writing exemplars. They are timely. A forensic document examiner can request checks written before and after the time of the questioned document to bracket that date.

Unfortunately, there is a decline in the writing of checks. Bob Fernandez, Philadelphia Inquirer staff writer, wrote a column in February, 2003 called "Check Writing May Be Going the Way of the Old 33 1/3." Remember the old 33 1/3 records? They and the 78s gave way to the 45 rpm records. Next came the eight track recordings (short-lived) and cassette tapes, followed by CDs. Each step was an improvement, but is the decline of check writing an improvement? Not for document examiners! Fernandez interviewed check writing operations officials in the Federal Reserve, store owners and bank officials. Following are some of the facts he discovered:

1. The decline of check writing in recent years probably signals the slow death of the check.
2. There has been a 20 percent drop in personal

and commercial check writing since the mid-1990s, as credit cards, check cards, debit cards and online banking services have reduced the need to pay with written checks.

3. Paper checks will continue to decline, whereas the use of plastic will soar.

Fernandez also reports: "The Federal Reserve sorts checks from banks at 45 locations in the United States. At the same time, it credits and debits accounts to settle payments on the checks, then routes the original checks back to the issuing bank. The checks may be returned to the check writer."

"The decline in paper check circulation is forcing the Federal Reserve to mothball some of its massive check reader sorters and to lay off hundreds of employees who operate them. It is the first major contraction of the Federal Reserve's check-processing operations, which boomed after World War II."

How serious is this? Fernandez concludes that:

"Checks are still king. The latest annual figures from the Federal Reserve show 30 billion electronic transactions and 40 billion checks processed in the United States."

Reference: Philadelphia Inquirer article, "Check Writing May Be Going the Way of the Old 33 1/3," by Bob Fernandez, February 2003.

*Phyllis Cook is a court qualified, board certified forensic document examiner. In 1972 she established The Philascript Co., Inc., and in 1979 she co-founded NADE. She has lectured throughout the country and authored articles and books on the subject of handwriting and document examination.*

## CASE NOTE

### EXAMINATION OF A PROMISSORY NOTE

by

Joe Jalbert

The authenticity of promissory notes is often questioned. In this case the questioned promissory note (illustration 1) was written in Spanish. This examiner was asked to determine if the defendant, Mr. C, wrote and signed the promissory note.

Original checks (illustration 4) and business agreement forms were submitted by the attorney for Mr. C. A writing sample duplicating the content of the questioned note (illustration 2) was requested by this examiner. Checks and forms written by Mr. P (illustration 5), the opposing counsel's client, were also requested. In this search for more exemplars from both parties, some interesting events occurred.

The opposing attorney provided original checks and other writing of his client, and the original promissory note. The promissory note was on a page in a spiral notebook belonging to Mr. P.

Another document examiner concluded that Mr. C did sign the promissory note, without opining as to who wrote the note itself - possibly because the other examiner did not have the request writing of Mr. C duplicating the promissory note. Different standards of comparison may lead to different conclusions. This is often the case when qualified document examiners differ. This examiner found significant handwriting information in writings in Mr. P's notebook.

This examiner considered another possibility - that Mr. C disguised his request writing or the questioned writing. A microscopic examination of Mr. C's request writing revealed no attempt at alteration, and it appeared to be naturally written. The strokes and formations were also similar to those found in Mr. C's normal course of business writings. There were no hesitation marks, tremors, or blotches in the questioned writing, and writing characteristics were consistent, indicating spontaneous writing.

Some of the features found in the body of the questioned note were also found in the writing in the spiral notebook of Mr. P. and in the alleged signature of Mr. C on the questioned note.

Based on all of the exemplars this examiner opined: The promissory note was not written and signed by Mr. C. More importantly, many identifiers supported the proposition that Mr. P wrote and signed Mr. C's name to the note. This could be determined only by a full examination of all the writing on the documents and accumulation of the proper exemplars to allow for all possibilities to be explored.

*R. Joseph Jalbert received his initial training in handwriting analysis and document examination from IGAS and WADE and studied for three years under a court qualified document examiner in Rochester, New York. He's been working in document examination for the past 30 years. He's a past President of the Upstate New York Chapter of the International Association for Identification and is a member of NADE. He's a graduate of Lowell Technological Institute and is in private practice in Rome, New York.*

4/22/00  
yo Wilfredo Charavria admito haber  
cometido un delito a Ivan Palacio y  
yo Jose Wilfredo Charavria  
le debo a Ivan Palacio la cantidad de  
\$150,000.00 para pagar 35,000 durante  
una semana de la fecha indicada  
arriba \$115,000.00 durante 6 meses  
sin intereses.  
Jose v. Muniz

Illustration 1 – The questioned promissory note and signature allegedly written by Mr. C.

4/22/00  
yo Jose Wilfredo Charavria  
admito haber cometido un  
delito a Ivan Palacio y yo  
Jose v. Muniz le debo a  
Ivan Palacio la cantidad de 150000  
para pagar 35000 dentro 1 Semana  
de la fecha indicada arriba y  
115000 dentro 6 meses sin  
intereses.  
Jose v. Muniz

Illustration 2 – The requested duplicate of the questioned note and signature written by Mr. C.

4/22/00  
yo Wilfredo Charavria admito haber  
cometido un delito a Ivan Palacio y  
yo Jose Wilfredo Charavria  
le debo a Ivan Palacio la cantidad de  
\$150,000.00 para pagar 35,000 durante  
una semana de la fecha indicada  
arriba \$115,000.00 durante 6 meses  
sin intereses.  
Jose v. Muniz

Illustration 3 – Some areas of interest in the comparison of the questioned writing with the known writing of Mr. C.

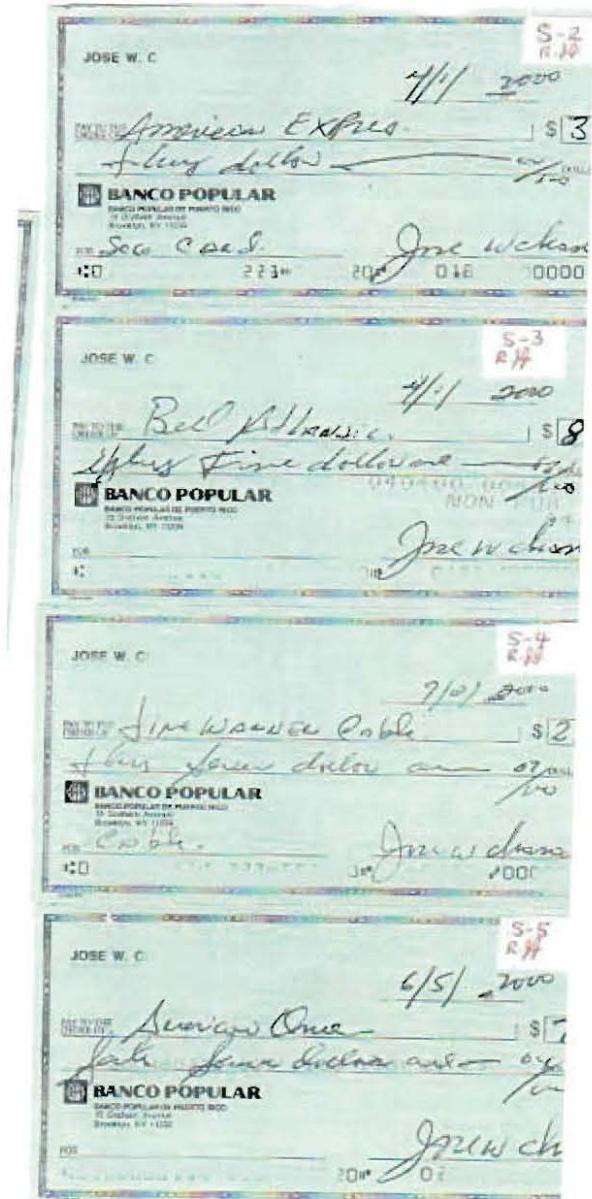


Illustration 4 – Redacted checks containing known writing of Mr. C.

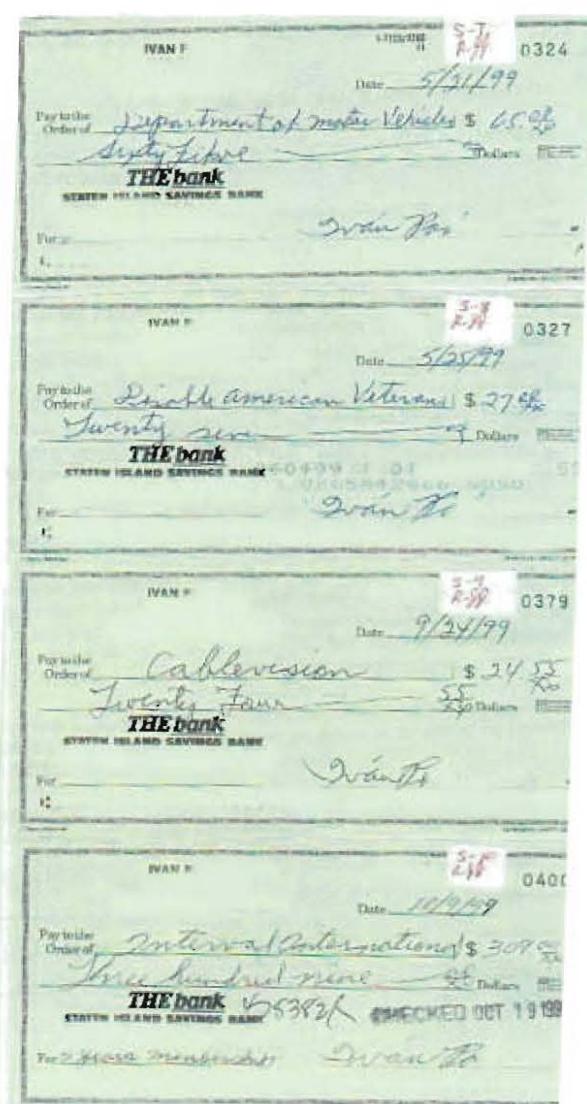


Illustration 5 – Redacted checks containing known writing of Mr. P.

## CASE NOTE

### A CASE OF TWO TYPISTS

By

Heidi H. Harralson, CDE

Although cases involving typewriters are becoming increasingly rare, they still surface occasionally. The questioned document in this case was a two-page will produced on a typewriter. The question was whether the first page of the will had been replaced. A preliminary investigation of the document indicated several visual differences between the two pages. Notably, page one was single-spaced while page two was double-spaced. Page number and initials were missing from page one, yet appeared on page two. Additionally, the weight of the paper of the two pages felt different to the touch.

A thorough examination yielded more conclusive results. The typewriter characteristics of the two pages were compared, and it was determined that both pages were typed on the same typewriter. Exhibit 1 demonstrates how the same typewritten letters were misaligned on both pages of the will. For example, the lowercase "i," "s," "r" and "e" are out of alignment with the other letters.

However, it was the typist's habits that were notably different. Idiosyncrasies in typing habits that vary from conventional typing standards were carefully noted. On page one (Exhibit 2), there were several misspellings; a 26mm difference on the right margin between the shortest and longest lines; inconsistent and

inappropriate spacing between words and punctuation; the erroneous use of the uppercase I to represent the numeral 1; and inappropriate and inconsistent use of capitalization.

On page two (Exhibit 3), there was one misspelling that was a result of not carrying a hyphenated word to the next line; an 8mm difference on the right margin between the shortest and longest lines; one instance of an extra space before a comma; and a tendency to erroneously repeat words, i.e. and, the.

The considerable difference between the typing habits of page one and two indicated that a different person typed the first page. The typist of page two was probably a more experienced and proficient typist who used punctuation, spacing, and spelling with greater accuracy while maintaining a fairly even right margin. The typist of page one showed a lack of proficiency exhibited by several misspellings, inconsistent spacing, and an uneven right margin.

Concerning the paper weight difference, an average reading by micrometer<sup>4</sup> revealed that page one had a paper thickness of 0.0045 while page two had an average reading of 0.0035. This clue by itself could have had a plausible explanation, but the significant difference in the paper weight contributed to mounting evidence that the first page of the will had indeed been replaced.

In an examination of both pages side by side under ultraviolet light, page one fluoresced more than page two. Additionally, transmitted light showed a significant difference in opacity between the two pages.

---

<sup>4</sup> Exact Automatic Micrometer manufactured by E. J. Cady Co.

There was also an examination of the paper wear and paper folds. Initially, this examiner was provided with the original will folded in an envelope. The will had been folded into three sections. There was evidence of more wear on the edges of page two.<sup>5</sup> Further, the folds of the paper did not match and the two pages were clearly uneven when folded together. Page two showed creases where it had been folded in different locations at least twice, while page one had evidence of only one set of creases.

Other important tests did not produce conclusive information. Because there were no watermarks on either of the pages, a determination of paper difference based on the examination of watermarks was inconclusive. Further, the development of indentations also did not produce conclusive results. However, it was important to perform the test as it could have revealed the handwritten initials that were inexplicably missing from page one.

This was a noteworthy case because of the unusual combination of clues that resulted in a conclusion that the first page of the will had been replaced. Additionally, it was the examination of the typist's individual habits, not mechanical typewriter characteristics, that helped prove that the document had been altered.

*Heidi H. Harralson, CDE, owns Spectrum Consultants in Tucson, Arizona and is a court-qualified handwriting expert. She has worked with attorneys, local police and the private sector in examining questioned documents. She has specialized in the research of 18<sup>th</sup> and 19<sup>th</sup> century historical writing, gang graffiti and coded communications. She is a board certified member of the National Association of Document Examiners and the American Board of Forensic Examiners. She has lectured to national conferences and organizational meetings throughout the country.*

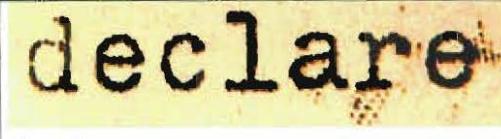
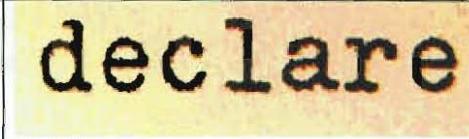
	
Page 1	Page 2
	
Page 1	Page 2

Exhibit 1 - The same typewritten letters are misaligned on each page.

<sup>5</sup> Although page two exhibited more wear, it was also a thinner paper, possibly resulting in decreased durability relative to page one.

uneven  
centering

LAST WILL AND TESTAMENT  
OF  
ARLENZ

I, ARLENZ A., a resident of P. County, Arizona, do make, publish and declare this to be my Last Will and Testament, revoking any and all Wills and Codicile, heretofore made by me.

This will replaces one dated November 23, 1999.

FIRST: I declare that I am a widow and that I have two biological children, who are now living and both adults. Namely Andie Be Etta, Jr. Br. does not share in my estate and should know why. If he should contest my will, he can receive the sum of \$ 100.00.

And thirteen (13) grandchildren receive my estate with percentage to share, as listed, with only the cash assets. This excludes my personal property, as stated in number (3). Following names to share as directed with cash assets:

And - Daughter 25%

Grandchildren, listed, each 10% - Heidi L. and Cameron

Grandchildren, listed, each 5% - Timothy	Gregory
Christopher	Curtis Jeffrey Spencer
Destiny	Cody Melissa Daniel
and Amy	

SECOND: I direct my Personal Representative to pay all expenses of my administration, of my last illness and of my funeral expenses to be paid out of the cash assets, if possible, of my estate.

THIRD: I direct my Personal Representative to distribute my tangible property as I direct, if I have a separate written statement, prepared by me for that purpose, that will direct my wishes. In the absences of such a statement, I devise and bequeath all my personal effects, household effects and automobile to Andie Be to receive these and doas she wishes.

FOURTH: I nominate and appoint my daughter, Andie Be as my Personal Representative of my estate. In the event my daughter is unable or unwilling to serve, I appoint my Grandson, Timothy, to serve and receive a fair amount for expenses and service.

FIFTH: If I own any real estate, the person or persons residing there, must make arrangements to secure a loan to settle my estate and have the cash received put into section ONE. C.D. \$, if any, go to the person listed as P.O.D. (paid on death). at maturity.

SIXTH: In the event any separate provision of this LAST WILL AND TESTAMENT is held to be invalid by a court of competent jurisdiction, that such finding shall not invalidate this entire Last Will and Testament, but only the subject provision.

SEVENTH: If any of those named above are deceased, that ends their part to share in the estate, it is only for those living.

26 mm

Key:

red underline - misspellings

red vertical lines - measurement of right margin

yellow highlight - spacing errors

green highlight - use of uppercase I for numeral 1

blue square - incorrect use of case

pink highlight - typographical errors

page number and  
initials missing

Exhibit 2 is a redacted copy of page one of the questioned document, showing the typing style on that page.

PAGE 2

double I, ARLENE the Testatrix, sign my name to this instrument  
spacing this 21st day of March, 2000 and do declare to the undersigned authority  
that I sign it willingly, and that I execute it as my free and  
voluntary act for the purposes therein expressed, and that I am  
over eighteen years of age, of sound mind, and under no constraint or  
undue influence.



*Cheer*  
ARLENE Testatrix  
*Notary Public of signature of Testatrix*

Notary Public - Fawn Echeverria  
My commission expires June 16, 2000

We, the undersigned witnesses, sign our names to this instrument,  
and that the Testatrix signed it willingly and to the best of our knowledge  
the Testatrix is of sound mind, under no constraint or undue  
influence and over the age of eighteen (18).

8 mm

WITNESS

Address

1. *Monica Harlene*

543 W.  
Casa Grande, AZ  
85222

2. *Ronald D.*

419 L.  
Casa Grande, AZ  
85222

Key:

- red underline - misspellings
- red vertical lines - measurement of right margin
- yellow highlight - spacing errors
- blue highlight - double words

Exhibit 3 is a redacted copy of page two of the questioned document, showing the different (from page one) typing style on that page.

## FORENSICALLY SPEAKING

+ A negotiable instrument is a check, promissory note or written contract for payment of a sum of money. It may be transferred to a different holder of the contract with the authority to enforce payment.

+ Antony van Leeuwenhoek was a maker of microscopes in the 1600s. He assembled approximately 250 microscopes, and some of them magnified 270X.

+ All writing paper is sized by a water-resistant material, such as rosin, so that the ink will not run or spread.

+ Calendering is a process that gives paper its polished look and/or given an embossed or moiré surface.

+ Halogen light is an incandescent light, meaning that it passes electrons through a tungsten filament, which gives off light and heat. A halogen bulb lasts longer than a non-halogen tungsten light because the tungsten that is burned off the filament binds with the halogen gas in the bulb and is redeposited on the filament, extending the life of the filament. To make this life cycle work, the temperature must be kept up, which is why a halogen bulb is very hot. The glass envelope in a halogen lamp can reach 1000 degrees Fahrenheit, which is double the temperature of an ordinary bulb. This hotter filament is what gives the halogen light its whiter color. The high temperature of the bulb also explains why it consumes a lot of electric power.

Source: *Light Bulb with a Dark Side*, by

Matthew L. Wald, The New York Times

A fiber optic light pipe contains a bundle of glass fibers, each about the diameter of a human hair. Each fiber has a central core of optical glass and is clad with a different refractive index which allows the light to be transmitted through internal reflection. Light travels to the distant end of the fiber by a zigzag path of successive reflections. To assure maximum light input/output, each fiber bundle has an optical polish at each end.

The bundles of fibers are put together in a protective sheathing to limit the bend radius. If that radius is exceeded the fibers could crack. If the fiber optic light pipe is treated considerably, as a laboratory instrument, it will last an unlimited time, but forceful pressures on the ends or excessive bending configurations will cause damage. The ends of the fiber optic and lenses should be cleaned with a lens cleaner and lens paper periodically.

Source: Dolan-Jenner Fiber Optic Illuminator Instruction Manual

### Some Historic Forensic Dates:

+ 1714 – Henry Mill credited with the basic idea of the typewriter. Queen Anne granted him a Royal Letters Patent

+ 1814 – Typewriter ribbon invented by Alexander Bain

+ 1865 – First commercial Facsimile system available in France and created by Giovanni Caselli. Paris was connected with several other French cities.

+ 1870 - Checkwriters first introduced

+1872 - Christopher Latham Sholes of Milwaukee, WI, was the 52<sup>nd</sup> man to develop a typewriter. His machine, the Type-Writer, was the first practical commercial machine.

+1888 - Ball point pen first patented by John Loud

+1937 - Patent for dot matrix print head using 30 wires.

+1945 - Reynolds ball point pen mass-marketed

+1953 - Bette Nesmith produced the first correction fluid, "Mistake Out"

+ 1965 - Paillard, a Swedish company, patented the ink jet printer

+ 1972 - Diablo – first wheel typing unit

changed and shaped history. Examples of documents housed at the Karpeles Museums are:

- A Final Indian Peace Treaty, signed by every Indian tribe in the United States and the US President. Nine hundred and sixty-eight Indian Chiefs of all 189 tribes signed allegiance to the United States on this one treaty. The document, on several pages, measures over 30 feet in length. (Doc: DA 022213).

- A draft of the Bill of Rights, including some amendments that did not appear in the final version (Doc: BR 062788).

- The Papal Decree of Pope Lucius III in the year 1183 proclaiming the sacred duties of the Knights of the Holy Crusades (Doc: LU 04281183)

- The 1898 Cavalry Regiment Report, the 1904 call for an "United Nations" organization, and the 1906 first San Francisco Earthquake Proclamation – all by Theodore Roosevelt

The Karpeles Manuscript Library Museums would be an excellent source of information regarding questioned historic documents.

*Forensically Speaking is a regular submission by Phyllis Cook, B.S., BCDE, Diplomate with contributions in this issue by Emily Will, CDE. Our readers are invited to make contributions for any issue.*

The Karpeles Manuscript Library Museums are located in seven cities throughout the United States: Jacksonville, FL, Tacoma, WA, Santa Barbara, CA, Duluth, MN, Newburgh, NY, Buffalo, NY, Charleston, SC. These museums are dedicated to education by the preservation of the original handwritten letters and documents of the great authors, scientists, philosophers, statesmen, sovereigns and leaders who have

## **Submission Guidelines**

### **Types of Papers Accepted:**

1. Research papers report original, primary research in any area of QDE.
2. State of the Art Reviews survey the published literature on a specific topic in the field of QDE.
3. Case Reports present one particular aspect of a QDE case which is no longer subject to litigation or confidentiality. It is the responsibility of the author to obtain any required permission for use of material submitted. Should any litigation arise from improper use of materials, the liability belongs to the individual author, not to NADE.
4. Technical Reports discuss a single topic regarding equipment or methodology.
5. Letters to the Editor offer brief, specific comment on a current issue or on a paper previously published in the Journal.
6. OpEd (Opinion/Education) pieces set forth an opinion, pose a question, or inform about some aspect of QDE.

All papers must include references to support assertions and must present some information or viewpoint regarding some aspect of QDE which would be of value to readers.

The Editorial Board has avoided setting rigid guidelines for style and format. For example, both endnotes and footnotes are acceptable; bibliographic citations may follow standard sociological practice or legal practice, or other acceptable practice.

Authors may in general follow any standard style manual. That published by the U.S. Government Printing Office is recommended, since it is regularly up-dated and readily available. Papers should,

however, have these features:

### **Method of Submitting Papers:**

1. Send four (4) printed copies and one (1) 3.5" diskette with either an ascii file, text file, Microsoft Word file, or Word Perfect file of the paper to Barbara Downer, Editor. Alternatively, submissions may be sent via email to [downer@oldwiz.net](mailto:downer@oldwiz.net). It is preferable to receive the articles in Times New Roman font, 12 pitch, single column.
2. As part of the above, submit one camera-ready print copy or electronic file of each exhibit or illustration you intend to have in this paper. If you desire to submit illustrations electronically, contact the editor in advance to discuss format. Each illustration should have a figure number by which it is referred to in the paper, and a caption or text which succinctly identifies it and states its purpose.
3. For deadline information, contact the Chief Editor. Contact information is at the front of the journal.
4. It is highly recommended that you begin the process of writing your paper by discussing the potential for publication with one of the editors via email, telephone or letter. This discussion will take the place of submission of an abstract.

### **Style and Format:**

1. Title of the paper centered at top
2. Name(s) of author, and if multiple, the one(s) who will deal with the Editorial Board should be clearly indicated.
3. A brief professional bio of the author including degrees, certifications and relevant professional information.
4. The paper should have clearly demarcated sections. There are no rigid requirements in this

regard, only that it should be logically developed and helpful to the reader.

### **Copyright**

All papers published in the NADE Journal are copyrighted by the Journal. After publication, copyright reverts to the author, although it is agreed that NADE retains rights to reprint papers in any format for any purpose it deems fit, and to sell such papers at whatever price it wishes to set. All proceeds from the NADE Journal sales are property of the NADE Treasury.

### **Editorial Board**

The editorial board is currently comprised of five members. Each member reads every submission and comments are pooled. The purpose of the board is to assist members in writing successful papers and to ensure that a professional journal is published each year. The board may accept or reject papers, and in most cases will work with authors to make any corrections deemed necessary.

 NOTES 